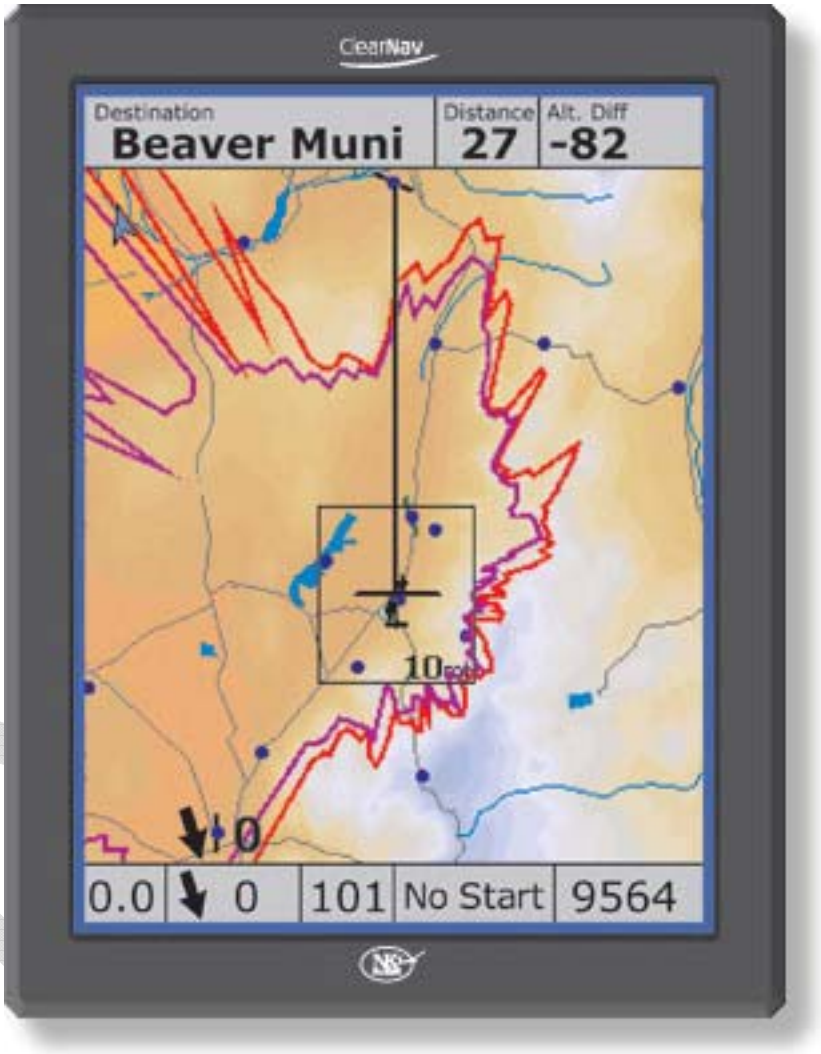
ClearNav
Destination
Beaver Muni
Distance
27
Alt. Diff
-82
10
0
0.0
0
101
No Start
9564

ClearNav

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Contents

1 Introduction 9

1.1 Contributors 10

1.2 Updates 10

1.3 Step-by-Step Directions Format 10

1.4 Macintosh Computer Users 11

1.5 Important Notices 11

1.5.1 Before You Fly 11

1.5.2 Fly Safely 12

1.5.3 Not a Certified Instrument 12

1.5.4 Warranty 12

1.5.5 Repairs 13

2 System Overview 13

2.1 Hardware 13

2.1.1 ClearNav Display 15

2.1.2 ClearNav Handheld Remote 16

2.1.3 ClearNav Stick Mounted Remote 16

2.1.4 Nexus Wiring Board 17

2.1.5 ClearNav In-Panel Mounting Kit 20

2.1.6 RAM Mount Kit 21

2.1.7 ClearNav DB15 Extension 23

2.1.8 GPS Antenna 24

2.1.9 Panel Mounted CAN/USB Extension 25

2.1.10 External Devices 25

DRAFT

2.1.10.1 USB Flash Drive 26
2.1.10.2 Cambridge Aero Instruments 302 27
2.1.10.3 FLARM 28
2.2 Software 28
2.3 Data Files 28
2.3.1 Waypoint Files 29
2.3.1.1 Worldwide Soaring Turnpoint Exhange (.stx) files 29
2.3.1.2 Cambridge (.dat) files 29
2.3.1.3 SeeYou (.cup) files 29
2.3.2 Airspace Files 30
2.3.2.1 Tim Newport-Peace (.sua) files 30
2.3.2.2 OpenAir (.txt) files 30
2.3.3 Worldwide Soaring Turnpoint Exchange 30
2.3.3.1 Downloading .stx Waypoint Files from the Worldwide Soaring Turnpoint Exhange 30
2.3.3.2 Downloading Airspace Files from the Worldwide Soaring Turnpoint Exhange 31
2.3.4 Elevation Data 32
2.3.5 Shape Data (Cities, Rivers, Lakes and Roads, etc.) 32
2.4 Putting it All Together 32
2.4.1 How it Works 32
2.4.2 What it Does Do 32
2.4.3 What it Doesn't Do 32
3 Installation 33
3.1 ClearNav Display 33
3.1.1 On Front of Panel 33
3.1.2 Recessed into the Panel 33

DRAFT

3.1.3 On a RAM Mounting Arm 33
3.2 GPS Antenna 33
3.3 Handheld Remote Control 33
3.4 Stick Mounted Remote Control 33
3.5 Panel Mounted CANbus/USB Extention 33
4 User Interface 34
4.1 Remote Control 34
4.1.1 Zoom In (+) Button 35
4.1.2 Zoom Out (-) Button 36
4.1.3 Menu Button 37
4.1.4 Focus Button 38
4.1.5 Select Button 38
4.1.6 Arrow Buttons 39
4.2 Navigation Display (moving map, etc.) 40
4.2.1 Data at the Top of the Screen 41
4.2.1.1 Destination Window 41
4.2.1.2 Distance Window 41
4.2.1.3 Final Glide “Altitude Differential” Window 41
4.2.2 Ribbon Menu 43
4.2.2.1 Select Destination Icon 43
4.2.2.2 Bugs Icon 44
4.2.2.3 Water Ballast Icon 45
4.2.2.4 Map Orientation Icons 45
4.2.2.5 Backlight Intensity Icon 46
4.2.2.6 Task Edit Icon 47

DRAFT

4.2.2.7 Map Icon 48
4.2.2.8 Simulator Icon 51
4.2.2.9 Setup Menus (Brief Intoduction) 52
4.2.2.10 Ribbon Options Icon 53
4.2.3 Numerical Information Area (NIA) 54
4.2.3.1 MacCready Window 55
4.2.3.2 Glide Wind Window 55
4.2.3.3 Vario Window 58
4.2.3.4 Task Window 60
4.2.3.5 Altitude Window 67
4.2.4 The *Selection Box* 68
4.2.4.1 Pan the Moving Map Display 69
4.2.4.2 To View Data on a Nearby Turnpoint and Start Navigating to it 70
4.2.4.3 Create a *Mark Point* 71
4.2.4.4 To View or Disable Nearby Airspace 73
4.2.4.5 To Re-Enable Airspace that has been Disabled: 75
4.2.5 Glide Amoebae 76
4.2.6 MSL Altitude Glide Ring 79
4.2.7 Area Task Blue Arcs 80
4.2.8 Airspace Warning Window 81
4.3 Using the map 81
4.3.1 Change Destination 81
4.3.1.1 Using the Waypoint List 81
4.3.1.2 Using the Map 81
5 How To – File Transfers and Upgrades 81

DRAFT

5.1 Transfer Flight Logs from the ClearNav to the PC 81
5.1.1 Transferring Flight Logs from the ClearNav to the USB Flash Drive 81
5.1.2 Transferring Flight Logs from the USB Flash Drive to your PC or Mac 81
5.2 Transferring Waypoint and Airspace Files from the PC to the ClearNav 81
5.2.1 Transferring Waypoint and Airspace Files from your Computer to the USB Flash Drive 81
5.2.2 Transferring Waypoint and Airspace Files from the USB Flash Drive to the ClearNav 82
5.3 Upgrading the Firmware and Software in the ClearNav 82
5.3.1 Downloading the Firmware and Software Upgrade Files to your Computer 82
5.3.2 Transferring Firmware and Software Files from the PC to the USB Flash Drive 82
5.3.3 Transferring Firmware Files from the USB Flash Drive to the ClearNav 83
6 How To – Flying with the ClearNav 84
6.1 First Time Setup 84
6.1.1 Copy Waypoint and Airspace Files onto ClearNav 84
6.1.2 Power-up ClearNav 84
6.1.3 Select desired waypoint file 84
6.1.4 Select desired airspace file 84
6.1.5 Set UTC Time offset in the NIA info/Set window 84
6.1.6 Setup Pilot Preferences in the Pilot Preferences menu 84
6.1.6.1 Pilot Name 84
6.1.6.2 Final Glide Settings 84
6.1.6.3 Map Display Options 84
6.1.6.4 Units 84
6.1.6.5 Language 84
6.1.7 Enter Pilot Name and glider data for logger 84
6.1.8 Select Task Start, TP and Finish Rules 84

DRAFT

6.1.9 Select the desired Task Type 84
6.1.10 Enter a task 84
6.2 A Typical Day at the Gliderport 85
6.2.1 Power up 85
6.2.2 Enter a task or two 85
6.2.3 Fly a task 85
6.2.4 After landing – transfer the flight log to the USB memory stick 85
6.3 Local Flying 85
6.3.1 Navigation to nearby airports 85
6.4 Setup and Fly a Badge or Record Task 85
6.5 Setup and Fly a Contest Task 85
7 Setup Menu (Details) 85
8 Specifications 85
9 Wiring Diagrams and Cable Schematics 85
10 Glossary 85

DRAFT

Steve McLaughlin in his Nimbus 3, photo by Paul Remde

1 Introduction

Thank you for purchasing the NK ClearNav. The ClearNav is a soaring flight computer system with many innovative features. The key features are:

- Moving map display of:
  - Airports
  - Airspace
  - Terrain
  - Rivers, lakes, cities, etc.
  - Final Glide Calculator
  - 2 Glide Range Amoebae
  - MSL Glide Range Ring
  - Altitude (MSL or AGL)
  - Glide and Climb Measurements
    - Climb/Glide Netto
    - Average Climb
    - Average Glide Netto
- IGC Approved (pending) GPS Flight Recorder with built-in GPS engine and remote antenna
- Final Glide Calculator
- Powerful task optimization features
- Easy transfer of flight logs, waypoint and airspace file using a USB Flash Drive

The hardware and software that make up the ClearNav were designed to be:

- Simple and intuitive
- Easy to use in flight
- Easy to view in bright sunlight
- Innovative
- Reliable

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We hope you find the ClearNav useful and that it increases your enjoyment of the wonderful sport of soaring. Please let us know if you have any suggestions for improving the product or the manual.

1.1 Contributors

This manual was written by Paul Remde of Cumulus Soaring, Inc. (www.cumulus-soaring.com) with help from many NK employees and ClearNav users.

1.2 Updates

The latest version of this manual is available on the NK web site at http://www.nkhome.com/support/pdfs.html.

1.3 Step-by-Step Directions Format

This manual will use a basic "shorthand" method of presenting step-by-step instructions. This is done to keep the number of pages of the manual to a minimum so it is easy to print. Certainly, the detailed instructions below are very clear and easy to follow, but they use much more space than the Basic directions. Below are examples of Basic and Detailed step-by-step instructions. As you can see, the Basic version is much shorter, yet very clear. The Detailed version is shown here to clarify how to use the Basic version. The example below shows how to enable or disable the display of *Bearing* information in the *Distance* window.

To toggle the display of bearing information on or off:

Basic Instructions:

Step through the instructions from left to right. Use the Up, Down, Left or Right buttons as necessary to select each item. The "/" character is used to clearly separate each step.

> *Menu* button / *Setup Menu Icon* / *Personal Preferences Tab* / *Map Display Options* / *Wind & Bearing* / *Bearing Checkbox*

To return to the moving map display – press the *Menu* or *Focus* button. This last step is not usually included in the basic instructions.

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How to Interpret the Basic Instructions	
Basic Instructions	**Detailed Instructions**
Menu button	Press the *Menu* button to access the Ribbon Menu
Setup Menu Icon	Use the *Left* or *Right* button to select the *Setup Menu Icon* and press the *Select* button
Personal Preferences Tab	Use the *Left* or *Right* button to select the *Personal Preferences Tab*
Map Display Options	Use the *Up* or *Down* button to select *Map Display Options* and press the *Select* button
Wind & Bearing	Use the *Up* or *Down* button to select *Wind & Bearing* and press the *Select* button
Bearing Checkbox	Use the *Up* or *Down* button to select the *Bearing Checkbox* and use the *Select* button to toggle it on or off.
	Press the *Menu* or *Focus* button to exit the menu and return to the moving map screen

1.4 Macintosh Computer Users

This manual has been written for users of Windows PC computers. However, using a Macintosh to transfer waypoint, airspace, firmware upgrade and other files to the ClearNav is fine. File transfers are done using a USB Flash Drive which will work equally well in a Macintosh computer. Some "How To" sections in the manual give specific instructions with PC users in mind, but Mac users will find it easy to accomplish the tasks using their Macs. This manual does not attempt to give specific instructions for Mac users.

1.5 Important Notices

1.5.1 Before You Fly

- **Read the Manual**
  Before you fly with the ClearNav, please read this manual while "playing with" a ClearNav unit on the ground. You will find the unit much easier to use and more enjoyable after you have taken the time to learn how to use it well. The manual includes many detailed overview

sections but also incorporates several real world tutorials which should help you get the most out of your ClearNav. Please don't be intimidated by the large size of the manual. The manual includes many icons and graphics which help clarify things, but they take a lot of space – making the manual appear extra long. It is really a pretty quick and easy read.

- **Play with the ClearNav in Simulator Mode**
  The ClearNav Simulator is a great way to play with the ClearNav on the ground. It allows you to fly the little glider on the screen around your local gliderport. You can turn, adjust the speed and even bump the altitude up and down using the remote control. We recommend taking it for a spin all the way around several tasks in the simulator before using the ClearNav in the glider.

1.5.2 Fly Safely

It is very important to keep your eyes focused outside the cockpit as much as possible. Do not "play with" or configure the ClearNav while in flight. Learn to use the unit and configure it to meet your needs while safely on the ground. There have been several instances of very near misses (one glider nearly hitting another glider in flight) which were attributed to one or both pilots "playing" with their soaring flight computers or soaring flight software when they should have been keeping their eyes out of the cockpit looking for traffic.

1.5.3 Not a Certified Instrument

The ClearNav is designed to enhance your soaring flight. It is not intended to replace your certified primary flight instruments. It is not a replacement for good judgment – which remains the responsibility of the pilot. All calculations are only as good as the data used in the calculation. If incorrect data is entered then incorrect information will be provided by the device. For example: If the glider polar data is not entered correctly the unit cannot calculate accurate final glide information. Also, the unit makes no attempt to warn you to avoid impact with the terrain – it assumes that you will see and avoid terrain and other aircraft. Waypoint and airspace data is the responsibility of the pilot. The ClearNav has no way of knowing whether the data in use is inaccurate or out of date. The maps displayed by the ClearNav are designed to supplement (not replace) the use of aviation maps such as sectional charts, etc.

1.5.4 Warranty

This product is guaranteed to be free of defects in materials and workmanship for a period of TWO YEARS from the date of their first consumer purchase. NK will repair or replace any defective product or part when notified within the warranty period, and will return the product via domestic ground shipping at no charge. The following shall be excluded from warranty coverage: damage due to improper use or neglect (including corrosion); damage caused by severe or excessive impact, crushing or mechanical harm; modifications or attempted repairs by someone other than an authorized NK repair agent; normal usage wear and failed batteries. If no warranty registration or proof of purchase is provided, the warranty period will be measured from our date of manufacture. Except as otherwise

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provided herein, no other warranties, expressed or implied, are made with respect to these products, including, but not limited to, any implied warranty of merchantability or fitness for a particular purpose. NK assumes no liability for any damages, losses, or expenses resulting directly or indirectly from product use.

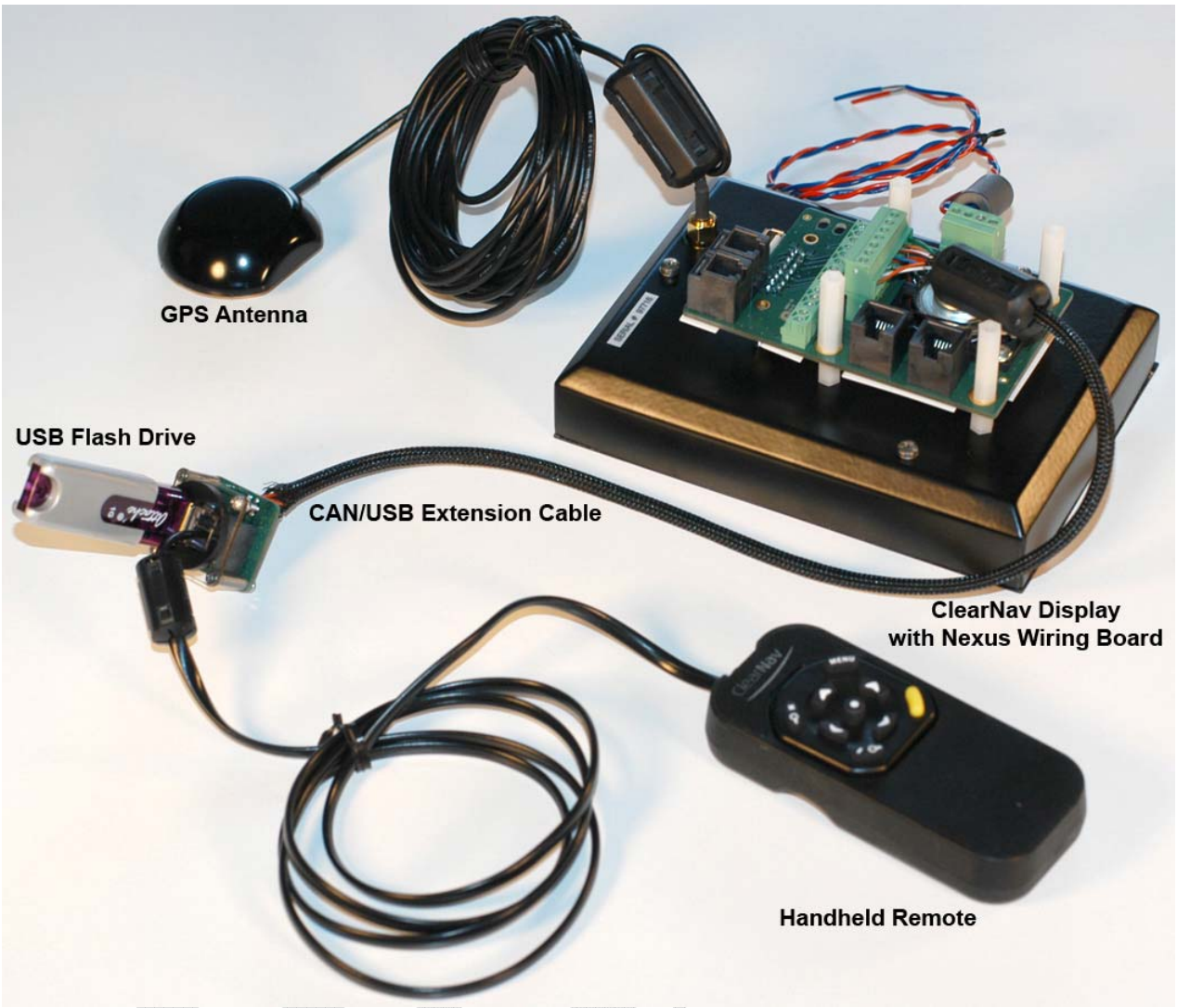
1.5.5 Repairs

2 System Overview

The complete ClearNav system consists of several components – including hardware, software and data files.

2.1 Hardware

The ClearNav system is delivered complete with everything you need to install it on the instrument panel.


GPS Antenna
USB Flash Drive
CAN/USB Extension Cable
ClearNav Display
with Nexus Wiring Board
Handheld Remote

2.1.1 ClearNav Display

The ClearNav "Display" is much more than a display. It includes:

- Large and bright LCD display
- Computer running the Windows CE.NET operating system. This operating system is similar to, but different from the Windows Mobile operating system used in Pocket PCs such as HP iPAQs. CE.NET can be thought of as the "industrial" version of the Windows Mobile operating system.
- ClearNavigator soaring flight software
- GPS engine and connector for external GPS antenna
- Pressure sensor for altitude measurements
- GPS Flight Recorder (IGC approval expected in 2008)
- Built-in SD memory card reader (in the side of the unit)
- 2 RS-232 serial ports for exchanging data with variometers, FLARM units, etc.
  The connections to the RS-232 ports are on the Nexus Wiring Board
- 2 CAN bus ports for connection to remote controls and 2nd seat displays, etc.
  The connections to the CAN bus ports are on the Nexus Wiring Board.
- USB Port for reading and writing to USB Flash Drive memory sticks
  There is one USB port on the back of the display and a remote USB port on the panel mounted CAN/USB Extension port – for easy access.
- Size: 4.25"w x 5.83"h x 1.22"d (108mm x 148mm x 31mm)
- Display Size: 3.39"w x 4.53"h (86mm x 115mm)
- Screen Resolution: 240 x 320 pixels
- Backlight: CCFL (Cold Cathode Fluorescent Lamp) backlight. Nominal luminance is 700 Candelas/m^2 (nits), achieved with a single lamp that goes around 3 sides of the LCD. NK provides lamp overdrive capability up to 1100 nits for severe ambient conditions such as flying

into a hazy late afternoon sun. This increases battery drain, so the display is normally operated at its nominal luminance.

- Weight: ~1 lb (450 g)
- Memory: 2 GB of internal memory for turnpoint, terrain, map and airspace information
- Power Input: 9 to 16 VDC
- Power Consumption: 600 mA at full brightness, 300 mA at min. brightness, In power-save mode the backlight goes to full brightness when any key is pressed on the remote keypad. It backs down to min. brightness about 25 seconds after the last key press.

2.1.2 ClearNav Handheld Remote

The *Handheld Remote* is designed to be easy-to-use in flight – even when bumping along in ridge lift and wearing gloves. It offers 9 intuitive buttons that make it easy to quickly access any software feature.

The *Handheld Remote* connects to the *ClearNav Display* through the panel-mounted connector on the *CAN/USB Extension*. It can also be connected directly to either of the 2 small RJ-22 connectors on the *Nexus Wiring Board* – but most customers will probably connect it through the *CAN/USB Extension*.

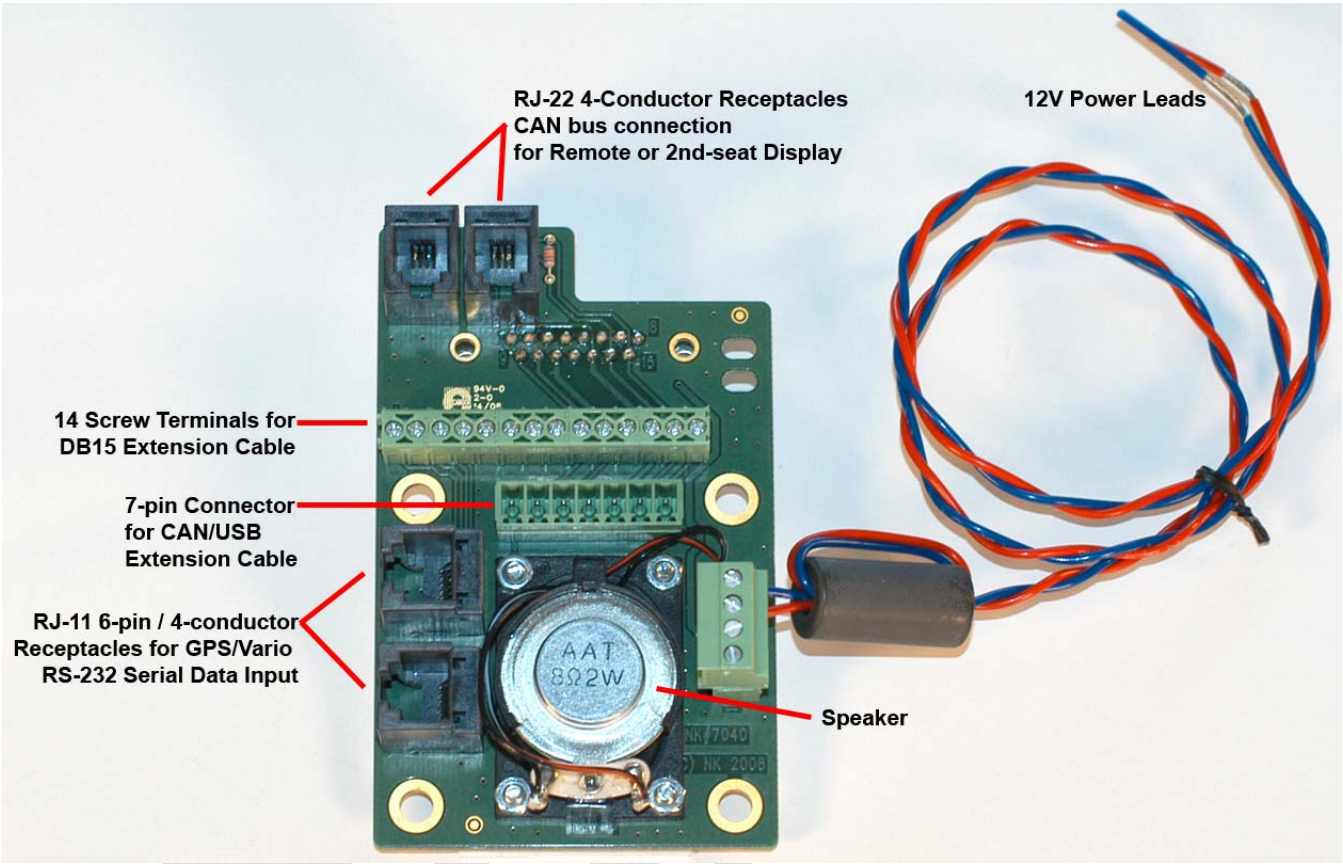
Dimensions: 100 mm (3.9 inches) long x 44 mm (1.7 inches) wide x 24 mm (0.94 inches) deep

2.1.3 ClearNav Stick Mounted Remote

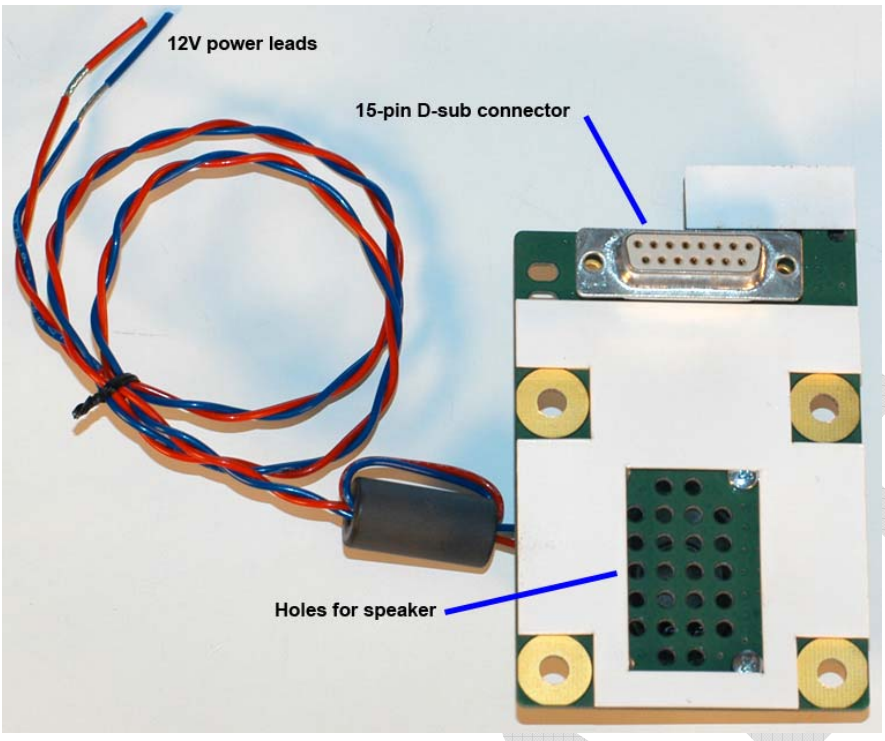
The Stick Mounted Remote is made from precision carved mahogany with a durable two-part epoxy finish. A 10-button remote control panel is mounted in top of the handle for comfortable, ergonomic control of ClearNav with flying hand. It includes all the same buttons in the same locations as on the standard handheld remote. It includes a PTT (push-to-talk) button and wiring. The hole for the stick is customized to the stick diameter. Please specify the stick diameter when ordering.

2.1.4 Nexus Wiring Board

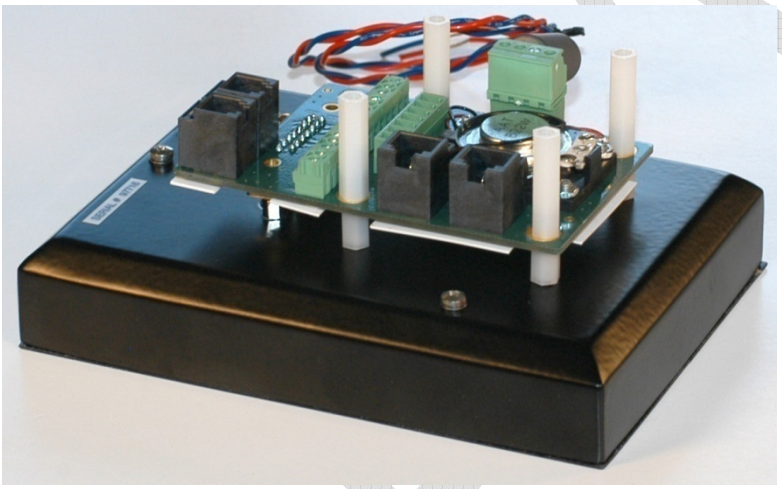
The *Nexus Wiring* Board is used to connect a variety of accessories to the ClearNav system. It connects to the *ClearNav Display* through a 15-pin D-Sub connector that is located on the back of the *ClearNav Display*. It includes a built-in speaker and includes the 7 connectors shown in the photograph below.



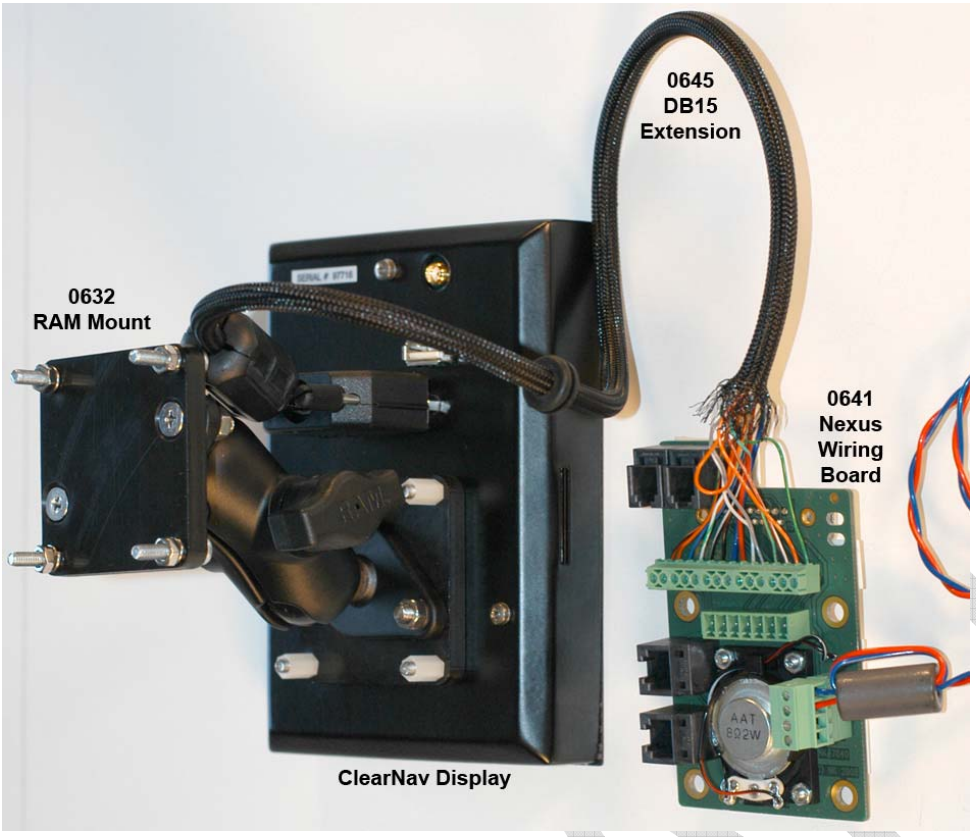
The "business side" of the *Nexus Wiring Board* includes a speaker, 12V power connections and a variety of data connectors.



The back side of the *Nexus Wiring Board* includes the DB-15 connector that is used to connect to the ClearNav Display and sound holes for the speaker.



When mounting the *ClearNav* Display on the front of the instrument panel, or recessed into the panel, the *Nexus Wiring Board* is mounted directly to the back of the *ClearNav Display* as shown above.



When the ClearNav is mounted on a RAM mounting arm the *Nexus Wiring Board* is mounted behind the instrument panel and connected to the *ClearNav Display* using the *DB15 Extension* cable as shown above.

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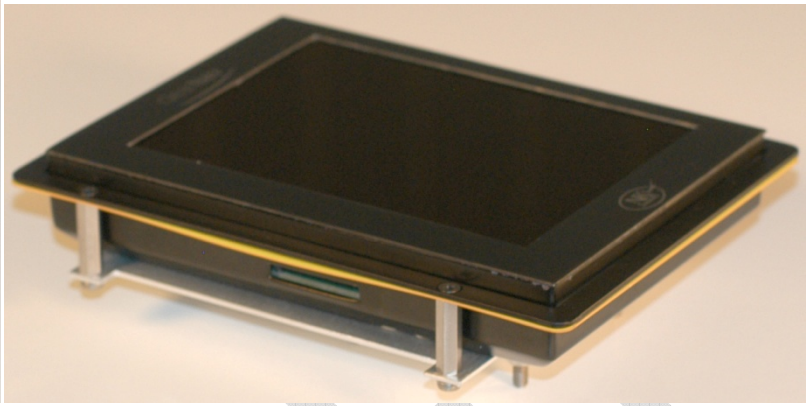
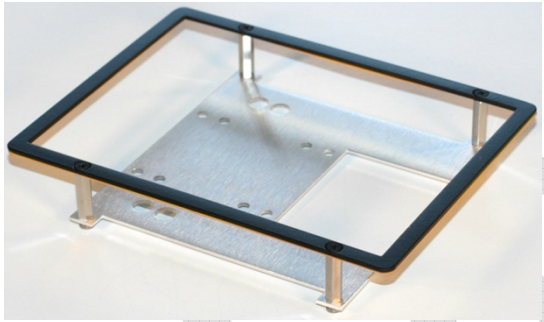
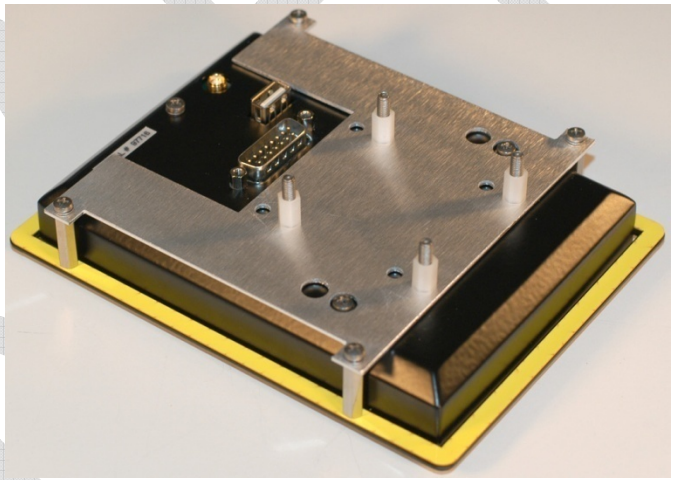
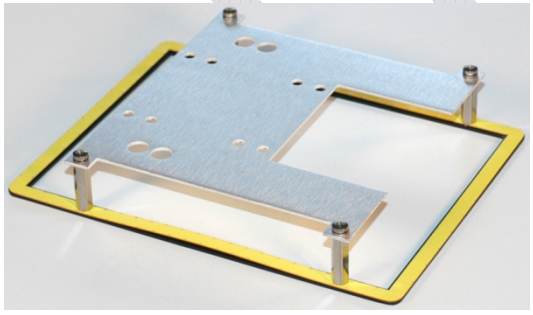
2.1.5 ClearNav In-Panel Mounting Kit

The *ClearNav In-Panel Mounting Kit* makes it possible to mount the *ClearNav Display* recessed into the panel for a very clean looking panel. Most installations done in new gliders will use this mounting method because it looks elegant. The kit included an aluminum bezel, standoffs, support bracket and a yellow template to use when making the holes in the panel.









In the photos above the yellow template is used as a stand-in for the instrument panel - to clarify which parts are on each side of the panel.

Note: The SD card reader slot is mounted on the side of the ClearNav Display and is not accessible from the pilot side of the panel when the *ClearNav In-Panel Mounting Kit* is used. That should not be a

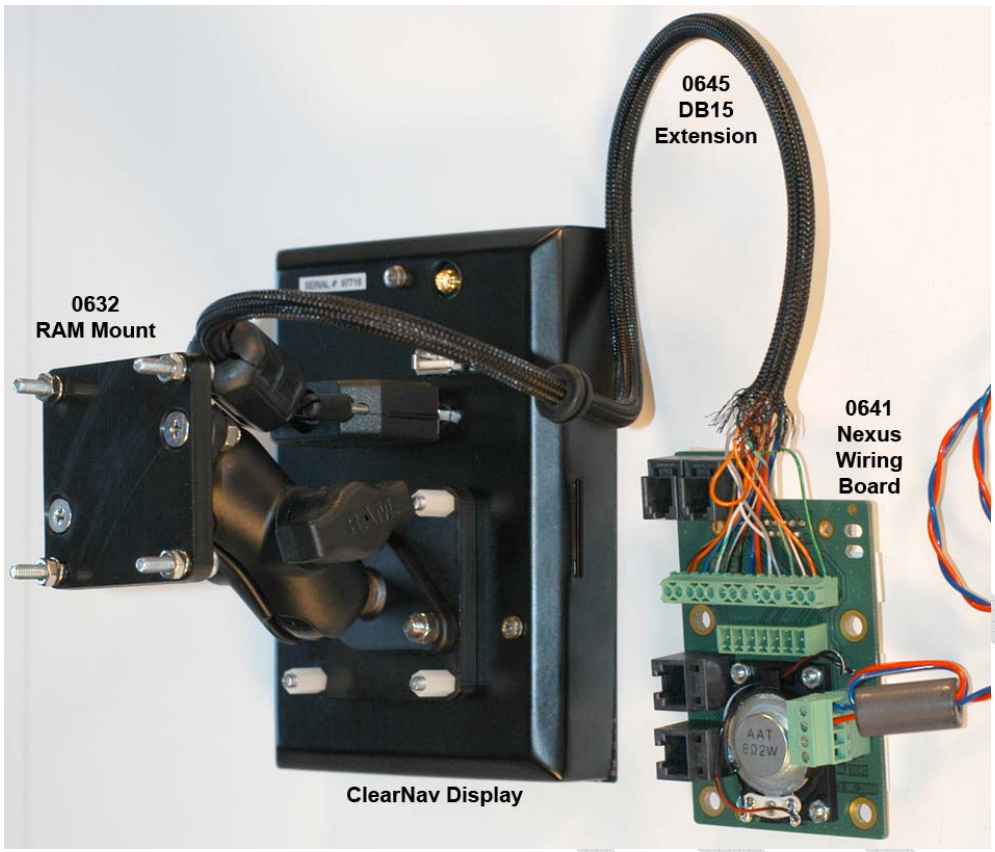
problem because a USB Flash Drive can be used for transferring files through the panel mounted *CAN/USB Extension* cable.

2.1.6 RAM Mount Kit

In some gliders it is preferable to mount the display on a mounting arm that is attached to the instrument panel. This is the case when there is not enough room in the panel to mount the unit on the panel. When mounted on a mounting arm, the unit takes-up less panel real estate. It is sometimes acceptable to partially block some instruments. Most customers will find that mounting the ClearNav directly on the instrument panel makes for a cleaner and classier installation than the RAM arm option, but those that prefer the RAM arm option will find that it is a rugged and reliable option. The optional 2 foot *DB15 Extension* cable is highly recommended for a neat installation. The *Nexus Wiring Board* is normally mounted behind the instrument panel with the *DB15 Extension* cable running from the *ClearNav Display* to the *Nexus Wiring Board.*

The kit includes:

- Short RAM "B" size arm with 1" balls and metal bases
- Panel reinforcement plate and mounting hardware
- Mounting adapter for attaching the RAM arm to the ClearNav


0645
DB15
Extension
0632
RAM Mount
0641
Nexus
Wiring
Board
ClearNav Display

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RAM Mount Installation
WITH Mounting Plate
Without Mounting Plate
1
Use mounting plate or ball mount as drilling template.
Mark hole locations with a pen.
2
Drill holes using 13/64" or 5mm drill bit.
3
Use pan head screws, split washers, and nuts
to secure mounting plate or ball mount to panel.
4
Attach second mounting plate
with ball mount to ClearNav
with short nylon standoffs
5
Tighten RAM arm to
both ball mounts.

2.1.7 ClearNav DB15 Extension

The *ClearNav DB15 Extension* cable is designed to connect a *ClearNav display* on a RAM mount to the *Nexus Wiring Board* that is installed behind the panel. The cable is a custom 14-conductor 2' cable with low-profile DB15 female connector. The cable is extremely flexible and has an abrasion resistant jacket. The cable is run through a 3/8" (1 cm) hole in panel and connected to a screw-terminal on the *Nexus Wiring Board.* The conductors are pre-stripped and tinned. A rubber grommet is included on the cable for use in the panel hole. A wiring diagram is included.

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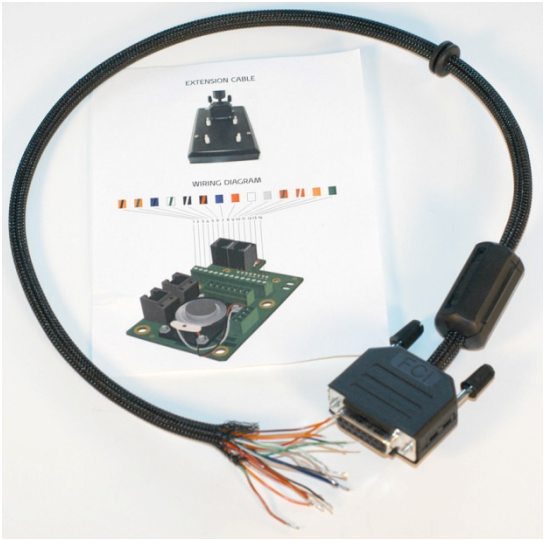
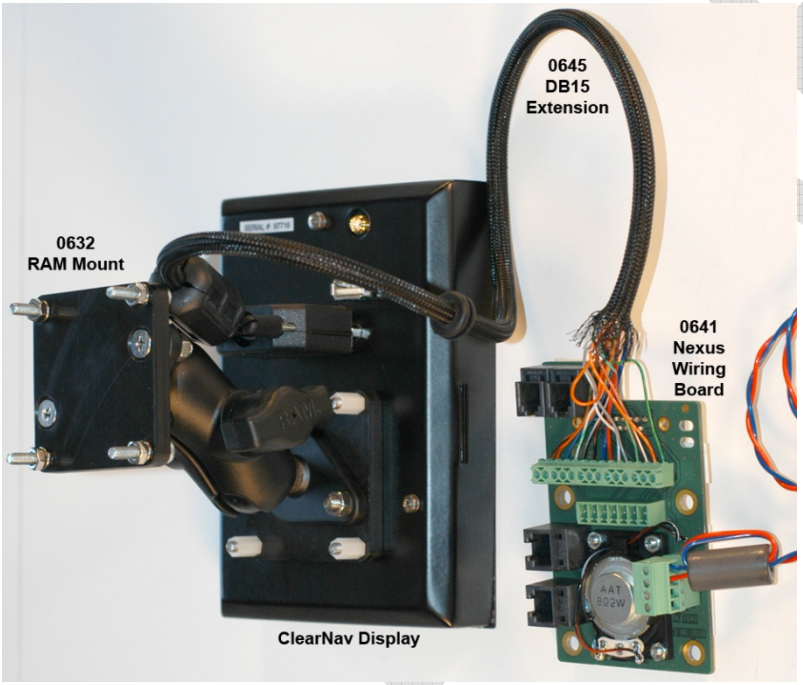


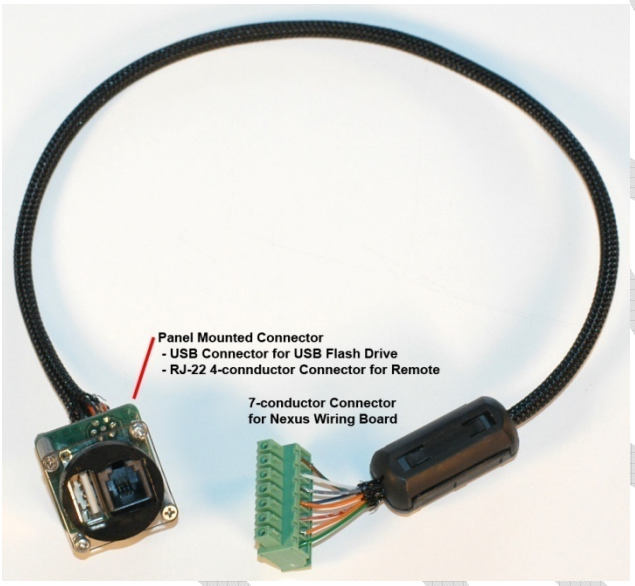


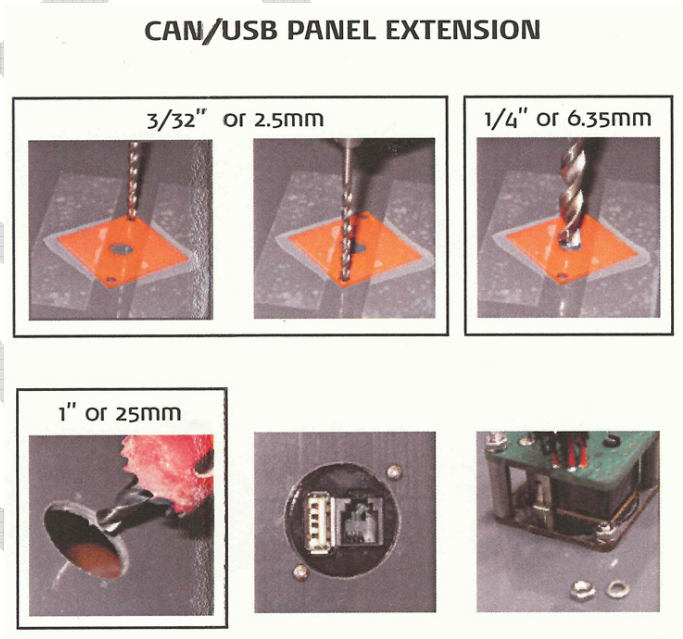
2.1.8 GPS Antenna

The ClearNav has a built-in GPS engine but an external antenna is required. It is included in the standard ClearNav kit. It consists of an amplified external GPS antenna and Dual-Lock mounting strips. The connector attaches directly to the back of the ClearNav.

2.1.9 Panel Mounted CAN/USB Extension

The *Panel Mounted CAN/USB Extension* brings USB and RJ-22 connectors out to a convenient panel mounted connector. It fits into a 1" (25 mm) round hole in the panel. The USB connector is used as a receptacle for a USB Flash Drive for transferring flight logs from the ClearNav and uploading waypoint and airspace files and software updates to the ClearNav. The RJ-22 connector is used by the *Handheld Remote*. A template is included for making the required holes in the panel. This item is included in the standard ClearNav system kit.


Panel Mounted Connector
- USB Connector for USB Flash Drive
- RJ-22 4-connductor Connector for Remote
7-conductor Connector
for Nexus Wiring Board



2.1.10 External Devices

2.1.10.1 USB Flash Drive

A USB Flash Drive is used to:

- Transfer waypoint, airspace and other data files to the ClearNav
- Download flight logs from the ClearNav
- Upload firmware upgrades to the ClearNav

USB Flash Drives are wonderful because they are simple to use and make it easy to transfer large amounts of data. When you plug one into your home computer it looks like a hard drive that you can transfer files to and from using the Windows Explorer (My Computer) program that is included with Windows.

The ClearNav ships with a USB Flash Drive in the box with folders and files installed at the factory. If you prefer to buy an additional USB Flash Drive you can find one at any local computer store or Target, Best Buy, Radio Shack, etc. A 1 GB memory stick with was supplied with the first batch of ClearNav units and it seems to have plenty of memory. A 2 GB Flash Drive would hold all the maps, airspace, elevation data, etc. for the entire world. At the time of this writing $20 would get me a 4 GB Flash Drive on Amazon.com. It doesn't hurt to get one that is larger than 1 GB. We recommend getting one in the 2 to 4 GB range, but larger is fine.

2.1.10.1.1 Transferring Flight Logs from the ClearNav to the USB Flash Drive

At the end of the flying day you simply plug the USB Flash Drive into the ClearNav's panel mounted USB connector and use the ClearNav's *Personal Preferences / Flight Recorder* menu to select and transfer the desired flight logs from the ClearNav's memory to the USB Flash Drive.

2.1.10.1.2 Transferring Files from the USB Flash Drive to the ClearNav

When you want to transfer waypoint, airspace or software or firmware upgrade files to the ClearNav you simply power-down the ClearNav, plug the USB Flash Drive into the ClearNav's panel mounted USB connector, and power-up the ClearNav. The ClearNav automatically transfers the files from the USB Flash Drive to the ClearNav's internal memory.

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2.1.10.2 Cambridge Aero Instruments 302

The Cambridge 302 is a great companion to the ClearNav. The following data can be received from the 302:

- Vector Wind (speed and direction)
- Real Time Headwind
- True Airspeed from the 302

The Vector Wind (speed and direction) and Real Time Headwind can be displayed on the map screen. The Vector Wind is used for final glide (as the auto wind) if it is available. The wind information supplied by the 302 is a little more accurate and can be calculated when cruising as well as when circling by comparing the True Airspeed to the GPS measured speed and direction. Without the 302 the ClearNav calculates wind using wind drift while circling. To display the Real Time Headwind received from the 302 simply enable that option under *Personal Preferences / Map Display / Wind and Bearing / Head wind Component*. The 302 supplied *True Airspeed* is used for the total energy final glide computation. When not connected to a 302, the airspeed is calculated using the measured wind and ground speed.

The Cambridge 302 can be connected to either of the RS-232 serial port connectors on the *Nexus Wiring Board*. The *Cambridge 302 to Nexus Board Cable* can be used for the connection. It is shown below. A Y-cable for connecting the 302 to both the ClearNav and a panel mounted connector for PDA or PC is also available from Cumulus Soaring, Inc.

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2.1.10.3 FLARM

FLARM is a collision alert system that is popular in many countries outside the USA. It has a built-in GPS, pressure sensor and radio transmitter and receiver. It broadcasts its position and altitude so that other FLARM units in the area will be alerted to its presence. It gives alerts if a collision is predicted using data received from other FLARM devices in the area.

The ClearNav can display FLARM data on the moving map display.

The FLARM unit can be connected to either of the RS-232 serial port connectors on the *Nexus Wiring Board*. The *FLARM to Nexus Wiring Board Cable* can be used for the connection. It is shown below.

2.2 Software

The ClearNav runs ClearNavigator software that is specifically designed to work with the ClearNav's unique remote control and other hardware. No other soaring software will work on the ClearNav system.

The ClearNavigator software is designed to be easy-to-use in flight and intuitive. Yet it is very powerful software with many innovative features – such as the glide amoebae and the way it handles turn area tasks.

2.3 Data Files

The ClearNav uses several types of data files for displaying map information, terrain elevation, airports and other waypoints, Special Use Airspace, etc. Fortunately, the ClearNav includes a large amount of memory so that it can hold map and terrain data for much of the world at once. It is important to make sure that the right data files are installed in the ClearNav so that you will have the best data available for your area.

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The good news is that the ClearNav supports several types of waypoint and airspace data files – to make it easy to find data for your area. However, there are some recommended file types. Using the recommended file types will allow the software to work at its best and display the largest amount of information.

Any experienced pilot will tell you that sometimes it is best to limit the amount of information on the moving map. Just because it is possible to display vast amounts of data on the map at once does not mean that displaying everything will be a good thing. Sometimes it is good to hide certain types to data to limit the amount of screen clutter. Fortunately, the ClearNav makes it easy to enable and disable certain types of data when desired.

2.3.1 Waypoint Files

Waypoint files consist of a list of navigation points to display on the map. There are several types of waypoints. They include airports, contest turnpoints, landing points (fields known to be good places to land when necessary), etc. The ClearNav supports waypoint files in the formats listed below. Links are provided to detailed data and example files for each file type.

When transferring waypoint files to the ClearNav, put the desired waypoint files into the "Map Data" / "Waypoints" directory on the USB Flash Drive or SD memory card. The files will be pulled into the ClearNav upon start-up.

2.3.1.1 Worldwide Soaring Turnpoint Exchange (.stx) files

The best type of waypoint file to use in the ClearNav is the *Worldwide Soaring Turnpoint Exchange* format. **It is highly recommended that you use this type of waypoint file whenever possible.** If you use this format airports will display on the map with the runway shown with the correct orientation. We'll call them .stx files. This waypoint file format is preferred over other compatible types because it can be extended easily to include types of data not supported in other waypoint file types. The great news is that .stx files are already available on the Worldwide Soaring Turnpoint Exchange for every soaring site listed there. Since the file is a simple tab separated text file, it is also easy to edit existing files manually, or create new files.
Description: http://soaringweb.org/TP/stx.html or http://soaringweb.org/TP/nk_clearnav.html
Example File: http://soaringweb.org/TP/Albert_lea/albert7c.stx

2.3.1.2 Cambridge (.dat) files

This format is OK, but it does not include as much information about each waypoint.
Description: http://soaringweb.org/TP/cai.html
Example File: http://soaringweb.org/TP/Albert_lea/albert7c.dat

2.3.1.3 SeeYou (.cup) files

This format is OK, but it does not include as much information about each waypoint and it supports only one attribute (Turnpoint, Airport, Landable, etc.) for each waypoint. The 2 file formats above

support multiple attributes for each waypoint.
Description: http://data.naviter.si/docs/cup_format.pdf
Example File: http://soaringweb.org/TP/Albert_lea/albert7c.cup

2.3.2 Airspace Files

The ClearNav supports Special Use Airspace Files in the formats listed below. There is no advantage to either of the formats. They should both work equally well in the ClearNav.

When transferring airspace files to the ClearNav, put the desired airspace files into the "Map Data" / "SUAs" directory on the USB Flash Drive or SD memory card. The files will be pulled into the ClearNav upon start-up.

2.3.2.1 Tim Newport-Peace (.sua) files

This format is used by Glide Navigator II.
Description: http://soaringweb.org/TP/sua.html
Example File: http://soaringweb.org/TP/Albert_lea/albert7d.sua

2.3.2.2 OpenAir (.txt) files

Description: http://www.winpilot.com/UsersGuide/UserAirspace.asp
Example File: http://soaringweb.org/TP/Albert_lea/albert7d.txt

2.3.3 Worldwide Soaring Turnpoint Exchange

The Worldwide Soaring Turnpoint Exchange is a fantastic site that was created by and is maintained by John Leibacher. It is so important to soaring pilots around the world that it is hosted on 3 different web servers – which are all identical copies of each other. If one site doesn't work for you, try one of the others. They can be accessed here:

- http://soaringweb.org/
- http://soaring.xinqu.net/JL/
- http://soaring.gahsys.com/

2.3.3.1 Downloading .stx Waypoint Files from the Worldwide Soaring Turnpoint Exchange

To download .stx waypoint files for your soaring site, or an upcoming soaring contest site, follow the directions below.

1. Go to the Worldwide Soaring Turnpoint Exchange using one of the 3 links above. http://soaringweb.org is the main site. Note that there is no "www" in the link.
2. Click on the "Turnpoint Exchange" link found under the "Worldwide" heading.
3. Click on the desired continent link near the top of the page – such as North America.
4. Scroll down to the desired country and state or region and click on the link to the desired soaring site.
   For sites in the USA you can dig down to the particular site in several steps. First click on the

small down arrow near the top of the screen to go "down to US table of contents". Then click on the desired state. Then click on the desired soaring site link – such as Albert Lea, MN.

5. Scroll down near the bottom of the page and left-click on the link on the left side of the screen for "Files formatted for downloading and importing into your programs".
6. You should now be on a page that contains files formatted for a wide variety of soaring instruments. The page is sorted alphabetically. The .stx waypoint file is listed in the "N" section as an "NK ClearNav" file. The process for downloading the file varies a bit depending on the web browser you are using. The directions given here apply to Internet Explorer. To download the file right-click on the left-most icon for the desired link. A pop-up menu should appear. Left-click on the "Save Target As…" option. A window will appear and allow you to select the desired folder to save the file into. We recommend saving it into the "My Documents / Waypoints" directory. That way you and other soaring pilots will know where to find it.

2.3.3.2 Downloading Airspace Files from the Worldwide Soaring Turnpoint Exchange

To download Tim Newport-peace (.sua) or OpenAir (.txt) airspace files (either file format works fine with the ClearNav) for your soaring site, or an upcoming soaring contest site, follow the directions below.

1. Go to the Worldwide Soaring Turnpoint Exchange using one of the 3 links above. http://soaringweb.org is the main site. Note that there is no "www" in the link.
2. Click on the "Turnpoint Exchange" link found under the "Worldwide" heading.
3. Click on the desired continent link near the top of the page – such as North America.
4. Scroll down to the desired country and state or region and click on the link to the desired soaring site.
   For sites in the USA you can dig down to the particular site in several steps. First click on the small down arrow near the top of the screen to go "down to US table of contents". Then click on the desired state. Then click on the desired soaring site link – such as Albert Lea, MN.
5. Scroll down near the bottom of the page and left-click on the link on the left side of the screen for "Files formatted for downloading and importing into your programs".
6. You should now be on a page that contains files formatted for a wide variety of soaring instruments. The page is sorted alphabetically. The airspace files are found in the "S" section under "Special Use Airspace". The process for downloading the file varies a bit depending on the web browser you are using. The directions given here apply to Internet Explorer. To download the file right-click on the left-most icon for the desired link. A pop-up menu should appear. Left-click on the "Save Target As…" option. A window will appear and allow you to select the desired folder to save the file into. We recommend saving it into the "My

Documents / Waypoints" directory. That way you and other soaring pilots will know where to find it.

2.3.4 Elevation Data

Elevation data is used to display terrain elevation maps on the map screen and is also used to display the AGL (above ground level) altitude. The data is available in large regions such as USA, Europe, or the entire world. It is pre-loaded into the ClearNav and stored on the provided USB Flash Drive. The elevation data is stored in the "Globe" directory on the USB Flash Drive.

2.3.5 Shape Data (Cities, Rivers, Lakes and Roads, etc.)

Shape data is used to display cities and roads ("Culture"), and rivers and lakes ("water") on the map. The data is available in large regions such as USA, Europe, or the entire world. It is pre-loaded into the ClearNav and stored on the provided USB Flash Drive. The shape data is stored in the "Shape" directory on the USB Flash Drive.

2.4 Putting it All Together

2.4.1 How it Works

2.4.2 What it Does Do

2.4.3 What it Doesn't Do

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3 Installation

3.1 ClearNav Display

3.1.1 On Front of Panel

3.1.2 Recessed into the Panel

3.1.3 On a RAM Mounting Arm

3.2 GPS Antenna

3.3 Handheld Remote Control

3.4 Stick Mounted Remote Control

3.5 Panel Mounted CANbus/USB Extension

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4 User Interface

4.1 Remote Control

The handheld remote control is designed to fit comfortably into your hand and be simple and intuitive to use in flight. The 9 buttons on the remote are large and easy to press – even while flying in turbulent air, and when wearing gloves. They have a very positive click feel and sound which make it clear when a button has been pressed and released. They also stand out from the remote which makes them easy to find with your thumb without looking.

The stick mounted remote control features the exact same pushbuttons as the handheld remote - making it easy to switch between the 2 remote control types.

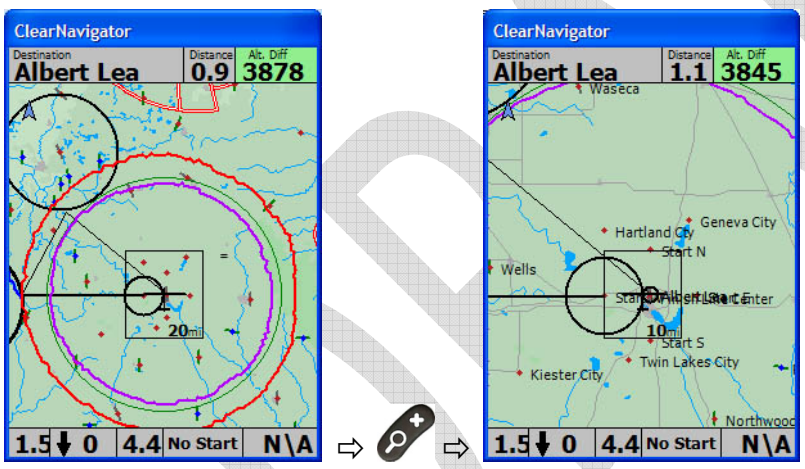
Below is a quick overview of the operation and use of the 9 buttons on the remote.

4.1.1 Zoom In (+) Button

The *Zoom In (+)* button is used to increase the zoom level of the moving map display. After zooming in you will see less of the moving map but will see it in more detail. To keep straight which zoom button to use - think of the *Zoom In (+)* button as pushing the glider's control stick forward to dive down closer to the earth. Since the *Zoom In (+)* button is located on the forward/top side of the remote – it makes sense – just push the forward button as if you were pushing the stick forward to get closer to the earth.

The rectangular *Selection Box* in the middle of the moving map display shows the current zoom level. The scale number shown is the width of the rectangle. In the screen capture below (left) the scale rectangle in the middle of the map is 20 miles wide. If you were to press the *Zoom In (+)* button once you would zoom in on the map and the number in the rectangle would be 10 miles.

Tip: When incrementing or decrementing numbers with the *Up* and *Down* buttons, the *Zoom In (+)* and *Zoom Out (-)* buttons can be used to increment or decrement the value in larger steps.



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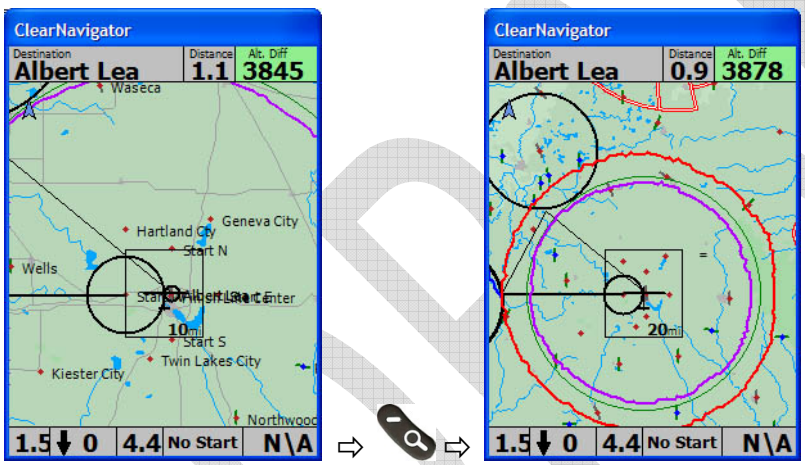
4.1.2 Zoom Out (-) Button

The *Zoom Out (-)* button is used to decrease the zoom level of the moving map display. After zooming out you will see more of the moving map but will see it in less detail. To keep straight which zoom button to use - think of the *Zoom Out (-)* button as pulling the glider's control stick back to climb up away from the earth. Since the *Zoom Out (-)* button is located on the back/bottom side of the remote – it makes sense – just push the back button as if you were pulling the stick back to climb away from the earth.

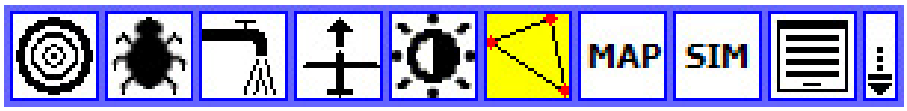
The rectangular *Selection Box* in the middle of the moving map display displays the current zoom level. The scale number shown is the width of the rectangle. In the screen capture below (left) the scale rectangle in the middle of the map is 10 miles wide. If you were to press the *Zoom Out (-)* button once you would zoom out and the number in the rectangle would be 20 miles.

Tip: When incrementing or decrementing numbers with the *Up* and *Down* buttons, the *Zoom In (+)* and *Zoom Out (-)* buttons can be used to increment or decrement the value in larger steps.

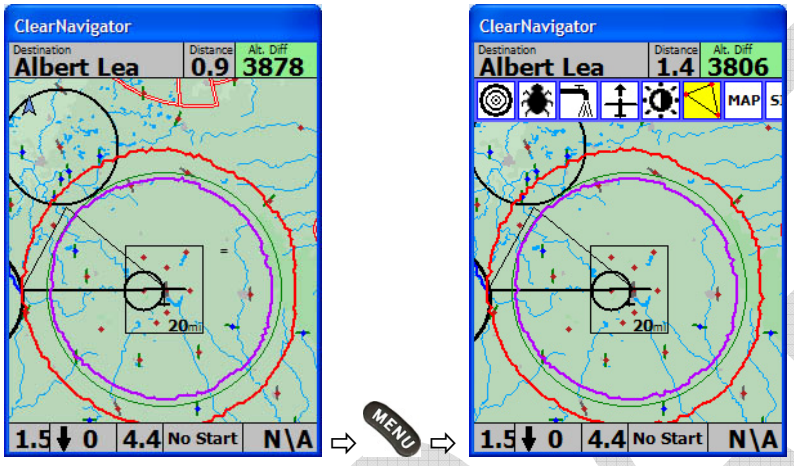


4.1.3 Menu Button

The *Menu* button is used to toggle the *Ribbon Menu* on and off. The *Ribbon Menu* appears near the top of the moving map screen and is shown below. Press the *Menu* button once to make the *Ribbon Menu* appear. Press the *Menu* button a 2nd time to hide the *Ribbon Menu*.



The *Ribbon Menu*



The *Ribbon Menu* as it appears near the top of the moving map display when the *Menu* button is pressed.

The *Menu* button also serves another important function. It can be used to exit the setup menus and return to the moving map display. The *Focus* button can also be used to exit any menu and return to the moving map display.

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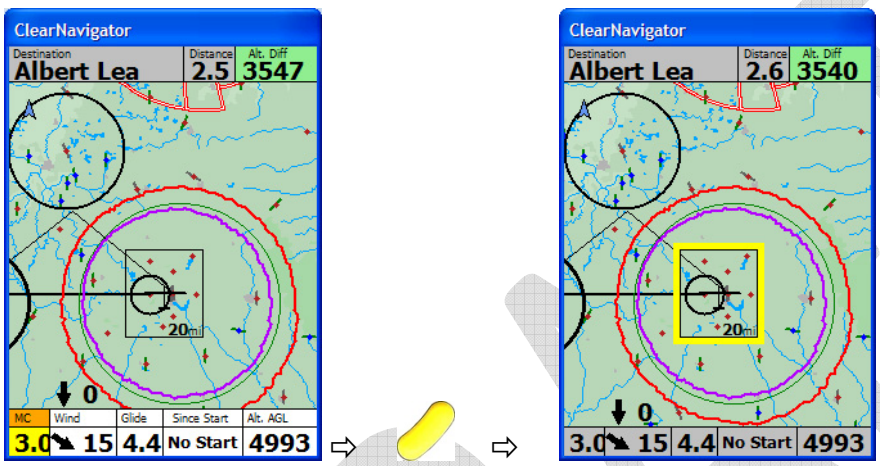
4.1.4 Focus Button

The *Focus* button is used to toggle the focus between the *Yellow Select Box* on the moving map and the *Numerical Information Area* (NIA) on the bottom of the moving map. The term focus is used by software programmers to refer to the item on the screen that is currently active. The item with the focus is the active item. When the *Yellow Select Box* has the focus you can move it around on the screen using the *Arrow* buttons. When the *Numerical Information Area* has the focus you can use the *Left* *and Right* *Arrow* buttons to move through the displayed parameters. The use of the *Focus* button is intuitive because the yellow color of the button matches the yellow color of the item on the screen that has the focus.



Changing the active item on the moving map using the *Focus* button.

Shifting focus to any item on the screen is temporary. For example, the *Numeric Information Area* will lose focus automatically 25 seconds after your last key press. The *Yellow Select Box* will lose focus 5 seconds after your last key press.

The *Focus* button also serves another important function. It can be used to exit the setup menus and return to the moving map display. The *Menu* button can also be used to exit any menu and return to the moving map display.

4.1.5 Select Button

The *Select* button is used to "select" or "enter" or "OK" or "acknowledge" or "confirm" the current selection. It is located at the center of the keypad and is extended out further than the other buttons to make it easy to find and activate without looking at the remote. The round shape is different from all the other buttons – which also makes it easy to find and activate with your thumb.

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4.1.6 Arrow Buttons

The *Arrow* buttons are used to navigate up, down, and across menus and to move the *Selection Box* to go to or view data on nearby airports or airspace.

The 4 *Arrow* buttons include:

- *Up* button
- *Down* button
- *Left* button
- *Right* button

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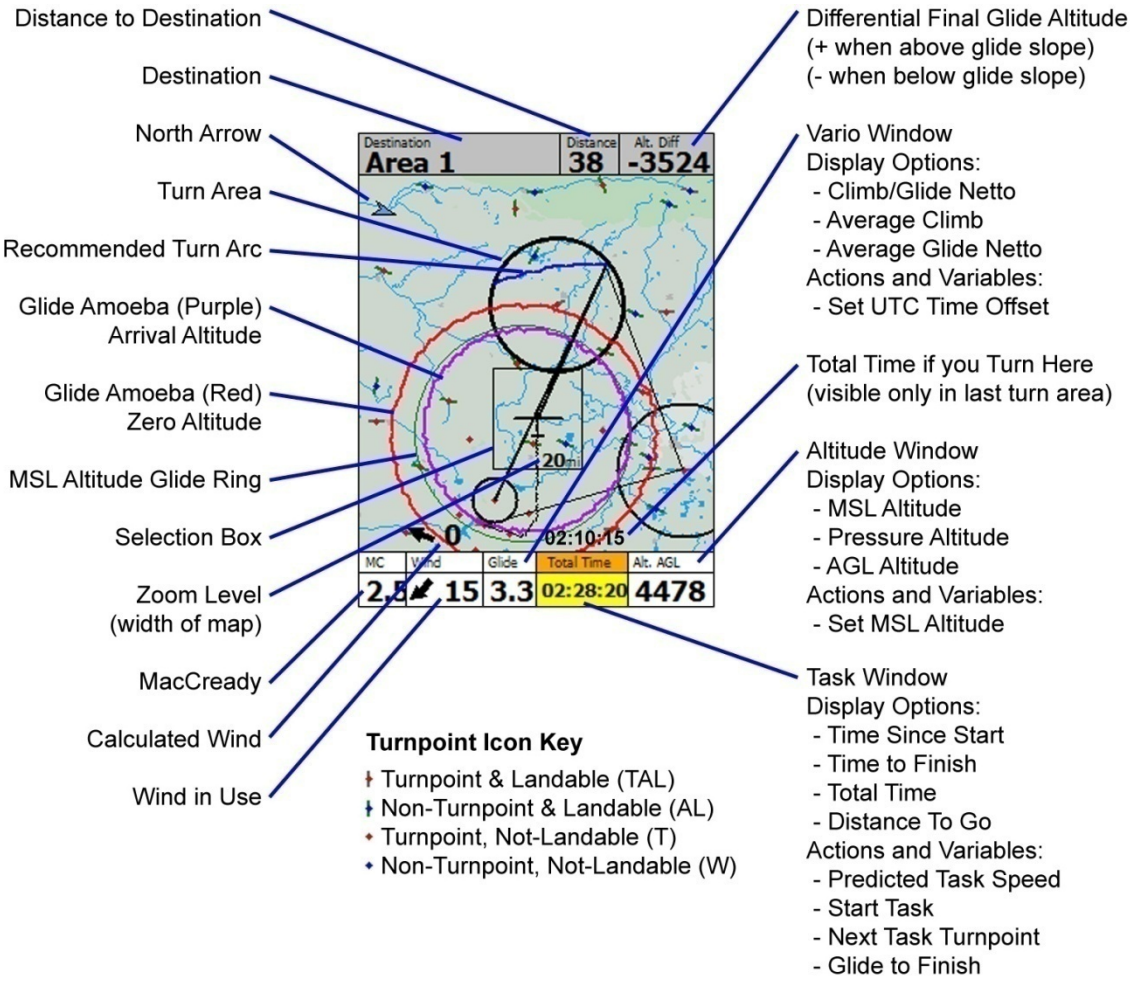
4.2 Navigation Display (moving map, etc.)

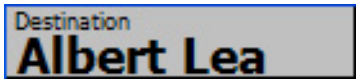
Overview of the data on the map



4.2.1 Data at the Top of the Screen

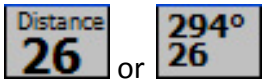
There are 3 data windows on the top of the moving map display.

4.2.1.1 Destination Window



The *Destination Window* is located in the top left corner of the moving map screen and shows the name of the current destination.

4.2.1.2 Distance Window



or

The *Distance Window* is located in the top row of the moving map screen, between the Destination and *Final Glide* windows. It always displays the distance to the destination and can optionally display the both the distance and bearing to the destination.

To toggle the display of bearing information on or off:

> *Menu* button / *Setup Menu Icon* / *Personal Preferences Tab* / *Map Display Options* / *Wind & Bearing* / *Bearing Checkbox*

4.2.1.3 Final Glide "Altitude Differential" Window

The *Final Glide Window* is located in the top right corner of the moving map display. The label "Alt. Diff." (Altitude Differential) indicates that the number displayed is the difference between the altitude required to make it to the destination (taking into account wind, airspeed, glider polar, MacCready setting, etc.) and your current altitude. When you are above glideslope the number will be greater than zero and the box will be colored green. When you are below glideslope the number will be less than zero and the box will be grey in color.

1785 feet or meters (depending on units setup) above glideslope

390 feet or meters (depending on units setup) below glideslope

Note on MacCready Setting

Changes to the MacCready setting will lead to changes in the final glide altitude differential number. Increasing the MacCready number will indicate that you should be flying faster and have higher sink rates and therefore require more altitude to make it to the destination.

Generally, new cross-country pilots tend to bump the MacCready value down to zero when trying to decide whether they can make it home. Their reasoning is that if they fly more slowly they may be able to make it home. At first thought this seems like a conservative approach because they are

optimizing your glide angle. However, many more experienced glider pilots consider it to be less safe than leaving the MacCready number at a setting that matches the actual soaring lift conditions. The reason is that at a MacCready setting of zero you are at the ragged edge of making it home. You have no margin for error (or sink). You can't slow down any additional amount to stretch your glide or speed up to get through sink. With the MacCready set to match the day's soaring conditions the flight computer will recommend that you have more altitude before starting your final glide which will allow you to slow down to stretch your glide in the future if necessary or speed up in sink and still have enough extra altitude to make it home. In addition, you will arrive home more quickly.

Total Energy Final Glide

The ClearNav uses a feature called "Total Energy Final Glide" to take airspeed into account when calculating glide altitudes. When your speed increases the number in the Final Glide window will decrease because less altitude is required to make it to your destination – because you can pull up and gain some altitude at any time. When your speed decreases the number in the Final Glide window will increase because more altitude is required to make it to your destination – because you have less extra energy to convert into altitude.

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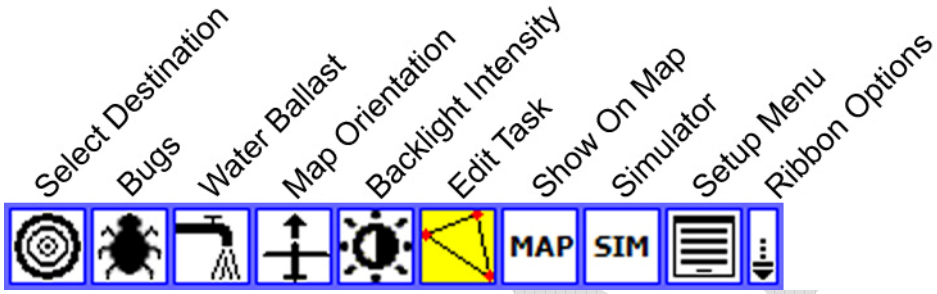
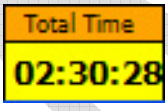
4.2.2 Ribbon Menu

The *Ribbon Menu* is accessed by pressing the *Menu* button on the remote control. The *Left* and *Right* buttons are used to move across the ribbon menu. The *Select* button is used to select the desired menu. To hide the *Ribbon Menu* press the *Menu* button or the *Focus* button . It is possible to wrap around from one side of the *Ribbon Menu* to the other side. For example, if you press the *Left* button while the *Select Destination Icon* is highlighted, the *Ribbon Options Icon* will be highlighted. Not all of the icons shown below will be visible in the *Ribbon Menu* at all times. For example, the *Simulator Icon* is only displayed when in simulator mode. Also, the *Ribbon Options Menu* can be used to disable icons that you don't use often.

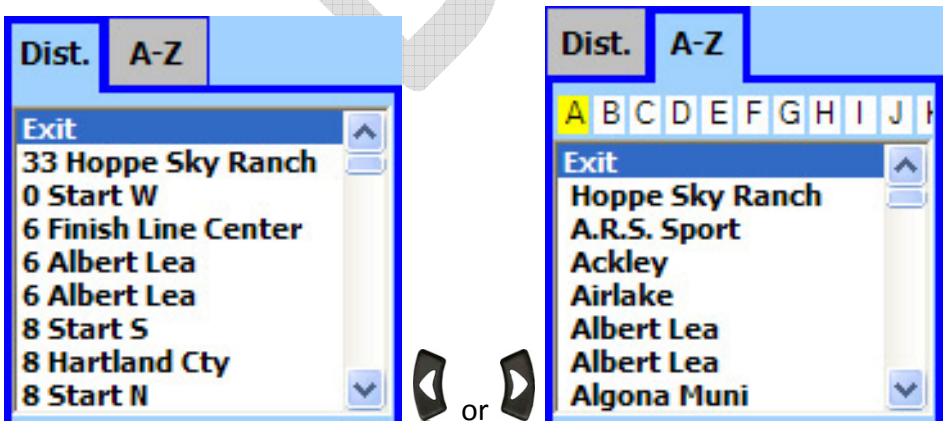


4.2.2.1 Select Destination Icon

The *Select Destination Icon* is used to change the waypoint to which the software is navigating. This is used mostly for "free flying" between waypoints – not when navigating through the waypoints in a pre-declared task. It is also often used when flying a task, but low and in need of a nearby airport at which to land.

> Note that the *Task Window* 
>
> at the bottom of the moving map screen is used to move through the waypoints in a pre-defined task.

The *Select Destination Window* has 2 tabs. The *Distance List Tab* lists the waypoints sorted by distance from your current location. The *Alphabetical List Tab* lists the waypoints alphabetically.



The *Left* and *Right* buttons are used to switch between the *Distance List Tab* and the *Alphabetical List Tab* – and to jump to the desired waypoint using the first letter of the waypoint. When you fist enter the Select Destination window pressing the *Left* button repeatedly will toggle between the 2 tabs. Pressing the *Right* button once will move you from the *Distance List Tab* to the *Alphabetical List Tab*. Pressing it additional times will move the cursor (the highlighted character) through the alphabet list near the top of the window. Once the highlighted character has moved into the alphabet it is a little less intuitive how to get back to the *Distance List Tab*. You need to move the highlighted cursor past either end of the alphabet (past "A" or "Z") – the *Distance List Tab* will then be selected – as if it was the 27th letter in the alphabet.

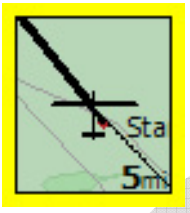
The *Up* and *Down* buttons are used to move through the lists.

The *Zoom In (+)* button can be used to jump up through the list one screen at a time.

The *Zoom Out (-)* button can be used to jump down through the list one screen at a time.

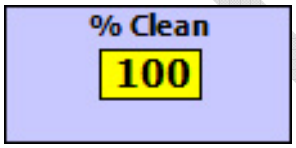
Press the *Select* button to select he highlighted waypoint and start navigating to it.

Selecting the Destination using the *Selection Box*
For nearby airports it is much easier and faster to use the *Selection Box* to select them as the destination. Using the *Selection Box* is described here.



4.2.2.2 Bugs Icon

The *Bugs* icon is used to access the bugs setting adjustment screen.



If your glider's wings are clean you would probably leave it set to the default of 100% clean. If you feel that you have picked-up a significant amount of performance degrading bugs or water droplets, etc. you can lower the number to degrade the polar used for final glide calculations. The range of the *% Clean* setting is 60 to 120 percent and the default is 100%.

When the *Bugs* icon is highlighted you can begin editing of the number by pressing either the *Select*, *Up* or *Down* button. You would think that you would need to press the Select button to view or change the setting, but the *Up* and *Down* buttons can also be used to bring up the adjustment screen.

Press the *Up* button to increase the setting by 1. Hold the *Up* button to scroll the number up.

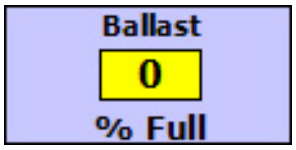
Press the *Down* button to decrease the setting by 1. Hold the *Down* button to scroll the number down.

Press the *Zoom In (+)* button to increase the setting in steps of 5%. Hold the *Zoom In (+)* button to scroll the number up rapidly.

Press the *Zoom Out (-)* button to decrease the setting in steps of 5%. Hold the *Zoom Out (-)* button to scroll the number down rapidly.

4.2.2.3 Water Ballast Icon

The *Water Ballast* icon is used to adjust the percent of water ballast on board.



The range is 0 to 100% and the default is 0%. It is adjustable in steps of 10%. Enter 0% if you are not carrying water ballast and enter 100% if you are at the maximum water capacity specified in the polar settings screen.

When the *Water Ballast* icon is highlighted you can begin editing of the number by pressing either the *Select*, *Up* or *Down* button. You would think that you would need to press the *Select* button to view or change the setting, but the *Up* and *Down* buttons can also be used to bring up the adjustment screen.

Press the *Up* button to increase the setting by 10%. Hold the *Up* button to scroll the number up.

Press the *Down* button to decrease the setting by 10%. Hold the *Down* button to scroll the number down.

Press the *Zoom In (+)* button to increase the setting in steps of 20%. Hold the *Zoom In (+)* button to scroll the number up rapidly.

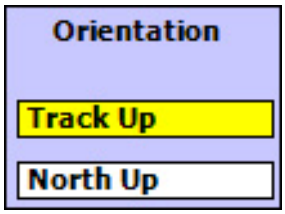
Press the *Zoom Out (-)* button to decrease the setting in steps of 20%. Hold the *Zoom Out (-)* button to scroll the number down rapidly.

4.2.2.4 Map Orientation Icons

The *Map Orientation* (or) icons are used to toggle the moving map between the *Track Up* and *North Up* modes. *Track Up* is commonly used when cruising in a straight line so the map

will be oriented to match the view out the window. *North Up* is commonly used when thermalling to keep the map from spinning around as the glider turns.

When the *Track Up* or *North Up* icon is highlighted you can view the *Map Orientation Window*



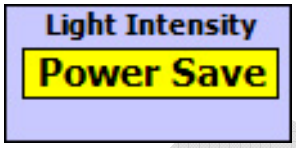
by pressing either the *Select*, *Up* or *Down* button. You would think that you would need to press the *Select* button to view or change the setting, but the *Up* and *Down* buttons can also be used to bring up the adjustment screen. That way only a single button press is need to make the change.

Press the *Up* or *Down* button to toggle between *Track Up* and *North Up* modes. The highlighted text (yellow background) indicates the selected mode.

Press the *Select*, *Menu* or *Focus* button to accept the highlighted selection and return to the moving map screen.

4.2.2.5 Backlight Intensity Icon

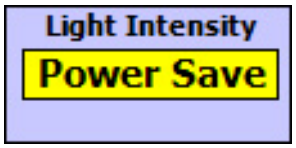
The *Backlight Intensity Icon* is used to access the *Light Intensity Window*.



There are 4 light intensity settings to select from:

- *High* – Full brightness, Great in sunlight, but draws about 600 mA of current from the glider battery.
- *Medium* – Medium brightness, A good compromise setting – pretty good in sunlight but with a bit less current draw (~500 mA?).
- *Low* – Low brightness, Less visible in bright sunlight, but much less current used (~400 mA?)
- *PowerSave* – In this mode the screen goes to the *High* setting when you are using the remote and backs down to the *Low* setting after 25 seconds of non-use. It goes back up to *High* immediately when you press any button on the remote.

When the *Backlight Intensity Icon* is highlighted you can access the *Light Intensity*



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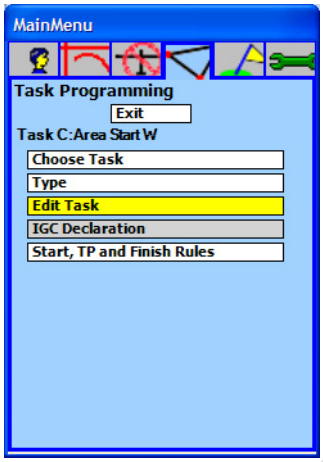
Window by pressing either the *Select*, *Up* or *Down* button. You would think that you would need to press the *Select* button to view or change the setting, but the *Up* and *Down* buttons can also be used to bring up the adjustment screen.

Press the *Up* or *Down* button to select the desired *Light Intensity* setting.

Press the *Select*, *Menu* or *Focus* button to accept the highlighted selection and return to the moving map screen.

4.2.2.6 Task Edit Icon

The *Task Edit Icon* is a shortcut that jumps directly to the *Task Programming Tab*



in the *Setup Menu*. The less direct way of accessing the *Task Programming Tab* is to select the *Setup Menus* icon and then press the *Left* or *Right* button 3 times.

The use of the *Task Programming Tab* will be described in detail in the Setup Menu section.

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4.2.2.7 Map Icon

The *Map Icon*

is used to access the *Show on Map Window*.

The *Show On Map w*indow can be used to quickly and easily select the type of data to display on the moving map. Experienced contest and cross-country soaring pilots would probably recommend keeping the information on the map to a minimum to reduce screen clutter and reduce the amount of time spent staring at the map – when your eyes should be looking out the window for traffic. However, there are times when the colorful data on the map is extremely useful and important. The best part is that it is easy to change the data to display in a few seconds while flying – so you don't need to be too worried about how you set it up. Below are 4 examples of varios map display options.

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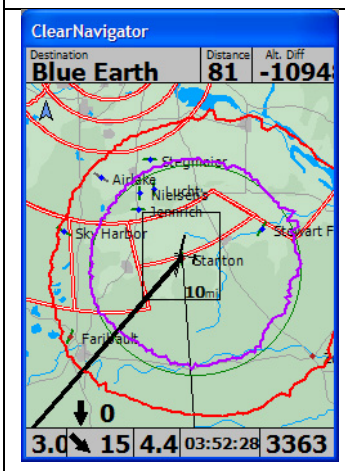
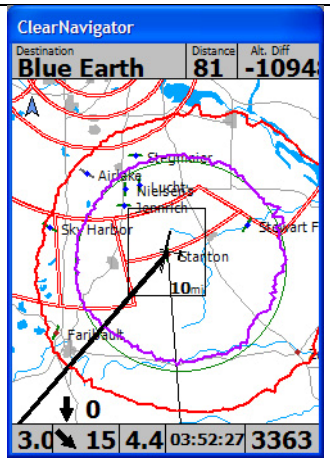
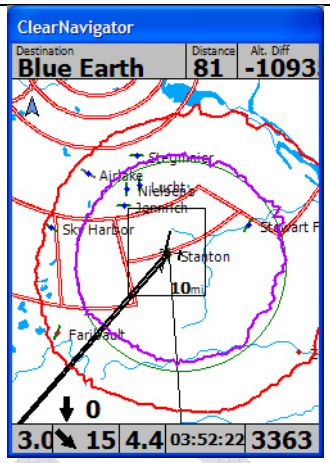
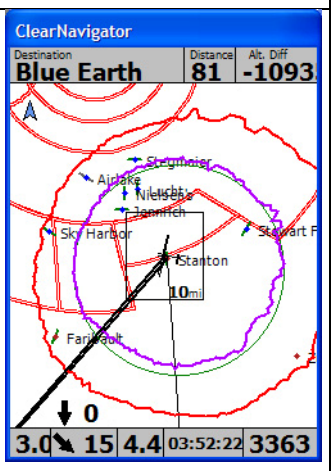
Map Data Display Examples

			
• Airports • Airspace • Water • Culture (Cities, roads, etc.) • Terrain Data	• Airports • Airspace • Water • Culture (Cities, roads, etc.)	• Airports • Airspace • Water	• Airports • Airspace

- ***Terrain Data***

  Terrain Data is colorful ground elevation data which shows mountains, valleys, etc. In mountainous areas it is nice to be able to compare the terrain seen out the window with the terrain on the map. However, the colorful data can increase screen "clutter" and make it more difficult to see the data you need to see to fly the task – such as airports and airspace. Therefore, some pilots will opt to turn off the display of terrain data (especially when flying in flat regions) to improve the contrast of the display and to reduce screen clutter.

- ***Culture***

  Culture data includes cities and roads which are displayed on the map in shades of grey. As with Terrain data, some pilots will want to view the data to help them confirm that the cities and roads viewed out the window match the data displayed on the map. Others will prefer to turn off the Culture data to reduce screen clutter. It is very easy to turn the display of the Culture data on an off. It can be enabled and disabled independently of the Water and Terrain data.

- ***Water***

  Water data includes rivers and lakes and other bodies of water. As with the Culture and Terrain data, some pilots will want to view the data to help them confirm that the rivers and lakes

viewed out the window match the data displayed on the map. Others will prefer to turn off the Water data to reduce screen clutter. It is very easy to turn the display of the Water data on an off. It can be enabled and disabled independently of the Culture and Terrain data.

- ***Landable Only***
  The Landable Only checkbox is used to hide any waypoints that are not setup in the waypoint database as "landable". It could be used when low to make it easy to view only airports or fields which can be used for landing. The default setting is unchecked – so that all waypoints will be displayed on the map, whether you can land there or not.
  Important Note: This feature is only as good as the data in the waypoint file. If the waypoint file has the "Landable" attribute assigned to airports that are not wide enough or long enough for your glider, you may have an "interesting" landing. It is your job to assure that the data in the waypoint file is correct.
- ***Tracks***
  The Tracks checkbox is used the enable or disable the display of glider tracks ("bread crumbs") on the map. The tracks can be extremely helpful for re-connecting with a lift source that was used minutes our hours earlier in the flight. Tracks are enabled by default.
- ***Erase Tracks***
  The Erase Tracks button can be used to erase all the flight track data displayed on the map. It does not affect the flight log data in the flight recorder. One situation in which you may want to erase the tracks is when the wind direction has changed significantly – making the circle tracks on the map from thermals earlier in the day useless.

The *Up* and *Down* buttons are used to move through the options and the *Select* button is used to toggle the checkboxes on and off or to activate the Erase Tracks button.

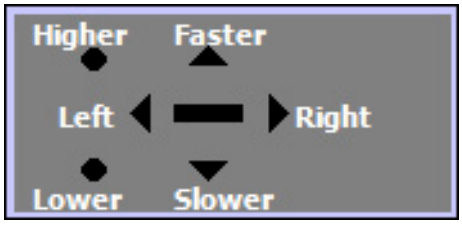
To exit the *Show On Map Window* press the *Menu* or *Focus* button, or use the *Up* and *Down* buttons to highlight the *Exit* button Exit and then press the *Select* button.

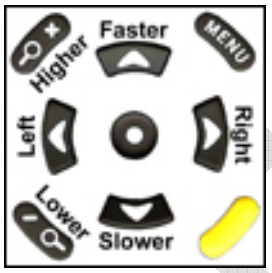
DRAFT

4.2.2.8 Simulator Icon

The ClearNav Simulator is a great way to play with the ClearNav on the ground. It allows you to fly the little glider on the screen around your local gliderport. You can turn, adjust the speed and even bump the altitude up and down using the remote control. We recommend taking it for a spin all the way around several tasks in the simulator before using the ClearNav in the glider.

The *Simulator Icon* is used to view the *Simulator Controller*. The *Simulator Controller* is used to make the glider in the simulator fly faster, slower, turn left or right, or to bump the altitude up or down. The image below shows the remote control features available in *Simulator* mode.

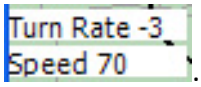




The image on the left is shown on the map screen when editing the simulator settings. The image on the right was created to make it very clear what each button on the remote does while the *Simulator Controller* is displayed.

The *Simulator Icon* is only visible when in Simulator mode.

Simulator mode can be entered upon startup, or using the *Menu* button / *Setup Menu Icon* / *Tools Tab* / *Simulator* button.

When the *Simulator Controller* is visible on the screen you can adjust the glider's speed, turn rate or altitude using the buttons on the remote control. When you adjust the turn rate or speed the current turn rate and speed will be displayed on the screen for a few seconds 

. A turn rate of zero will make the glider fly straight ahead. A turn rate that is greater than zero will turn the glider to the right and a turn rate that is less than zero will turn the glider to the left. The turn rate is in degrees/second. Note that the simulator uses turn rates that remain in effect until you change the rate back to zero. That way you can set the glider up in turn and it will continue to circle indefinitely.

Press the *Zoom In (+)* button to bump the glider's altitude up by 100 m (328 feet).

Press the *Zoom Out (-)* button to bump the glider's altitude down by 100 m (328 feet).

To hide the simulator controller, press the *Select*, *Menu* or *Focus* button.

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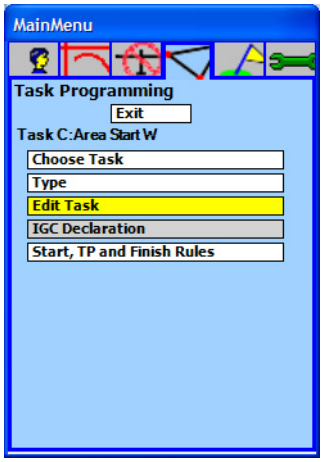
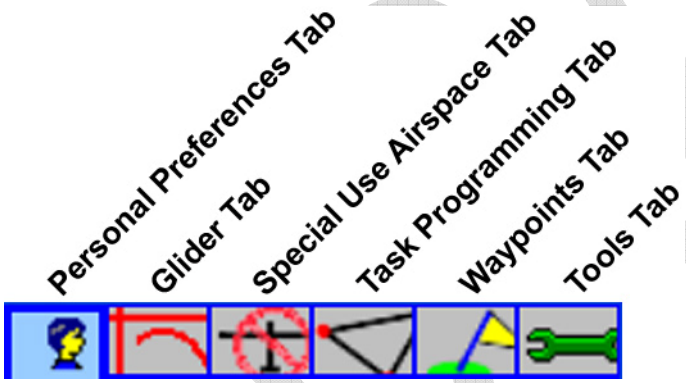
4.2.2.9 Setup Menus (Brief Introduction)

The *Setup Menu Icon* takes you to the Setup Menus. The *Setup Menus* are for setup items that are not generally changed in flight. It is highly recommended that you spend time going through the settings in every *Setup Menu* tab while on the ground to make sure that everything is set to match your preferences.

Details on the parameters in every *Setup Menu* are available here.



The *Setup Menus* are arranged into 6 tabs:



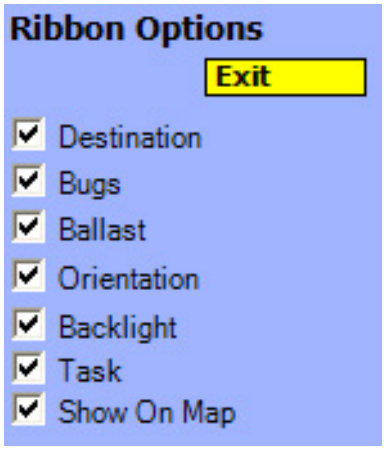
The *Left* and *Right* buttons are used to select the desired tab. The *Up* and *Down* buttons are used to select the desired menu item within the tab you are viewing.

Press the *Select* button to select a menu item.

To exit the *Setup Menu* and return to the moving map screen press the *Menu* or *Focus* button, or use the *Up* and *Down* buttons to highlight the *Exit* button Exit and then press the *Select* button.

4.2.2.10 Ribbon Options Icon

The *Ribbon Options Icon* is used to select which icons to display in the *Ribbon Menu*.



The *Ribbon Options Menu*

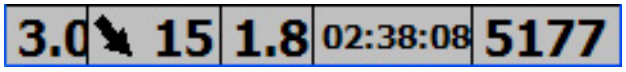
The *Up* and *Down* buttons are used to move through the options and the *Select* button is used to toggle the checkboxes on and off.

To exit the *Ribbon Options Menu* press the *Menu* or *Focus* button, or use the *Up* and *Down* buttons to highlight the *Exit* button Exit and then press the *Select* button.

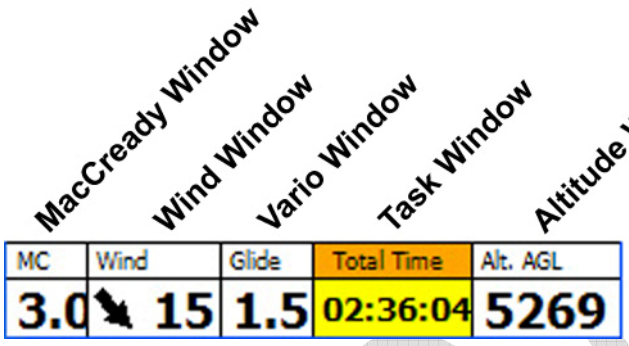
DRAFT

4.2.3 Numerical Information Area (NIA)

The *Numeric Information Area* (*NIA*) is found at the bottom of the moving map screen. There are 5 windows in the *Numeric Information Area*. They are designed to be easy to access in flight. The *NIA* is usually minimized to maximize space for the map, but it expands to show labels when it is accessed using the *Focus* button. All of the windows in the *NIA* can be edited. You can edit the *MacCready* and *Wind* data and you can select from several display options for the *Vario*, *Task* and *Altitude* windows. The Task Window is also used to start tasks, move through task legs and toggle the *Final Glide Window* display between glide to the next waypoint, or glide to the end of the task.



The *Numeric Information Area* (*NIA*) as it looks when minimized.



The *Numeric Information Area* (*NIA*) as it looks when activated with the *Focus* button - with descriptive labels added.

To select a particular window in the *NIA* press the *Focus* button and use the *Left* and *Right* buttons to move between windows.

To edit the data in a particular window press the *Up*, *Down* or *Select* button. The first press will pop up the edit window and subsequent presses of the *Up*, *Down* buttons will change the value or move through the available options.

To hide the pop-up edit window press the *Focus* or *Menu* or *Exit* Exit button.

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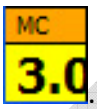
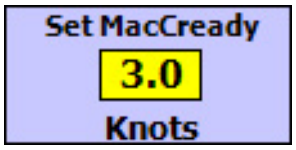
4.2.3.1 MacCready Window

The *MacCready Window* is found in the lower left corner of the moving map screen and is used to view and edit the *MacCready* setting. Please refer to your favorite cross-country soaring textbook for information on setting this number. Briefly - It is used to select the speed-to-fly between thermals. It is often set to the best estimate of the average climb rate in the next thermal. In the last thermal of the day it is set to the achieved climb rate in that therma

To edit the *MacCready* setting press the *Focus* button to activate the *NIA* and use the *Left* button or *Right* button to highlight the *MacCready Window* 

. Then use the *Up* and *Down* buttons to select the desired setting.



MacCready Set Window

The *Up* and *Down* buttons increment and decrement the *MacCready* setting in 0.5 knot (or 0.2 m/s) increments.

The *Zoom In (+)* and *Zoom Out (-)* buttons increment and decrement the *MacCready* setting in 1 knot (or 0.6 m/s) increments.

To hide the *MacCready Set Window* press the *Select*, *Focus* or *Menu* button, or wait and it will hide automatically in about 30 seconds.

4.2.3.2 Glide Wind Window

The *Glide Wind Window*

is found in the lower left corner of the moving map screen, to the right of the *MacCready Window*. The *Glide Wind Window* is used to view or edit the wind speed and direction that are used by the software for final glide calculations. We'll call the wind used for final glide calculations the *Glide Wind*. The ClearNav calculates wind speed and direction automatically using GPS data and measuring wind drift while circling. The ClearNav can also receive wind data from an external device such as a Cambridge 302, etc. The wind data provided by the Cambridge 302 is probably more accurate because it is calculated using airspeed data in addition to the GPS data – which makes it possible to measure wind while cruising. By default, the ClearNav automatically puts the *Measured Wind* into the *Glide Wind Window*. That method works well in many soaring locations and wind conditions, but there are times when you may not want to use the most recent measured wind for the *Glide Wind*. An example of that would be when you are about to head into a very different airmass – such as when gliding down into a valley or down onto a ridge. In that case it is easy to manually enter the *Glide Wind*.

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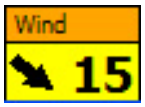
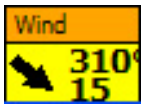
Wind Display Options

The *Glide Wind* and *Measured Wind* can be displayed in 2 ways.

- **Large Wind Speed Option (default)**
  The default is to display an arrow to indicate the *Wind Direction* and a number for the *Wind Speed*. This is a nice options because the *Wind Direction Arrow* and *Wind Speed* number are large an easy to read in flight.



- **Numeric Wind Direction Option**
  If you prefer to read the *Wind Direction* as a number you can enable the *Numeric Wind Direction* option. It is nice to be able to read the Wind Direction number, but the downside is that the text size must be reduced to fit both the *Wind Speed* and the *Wind Direction* into the *Glide Wind Window*.

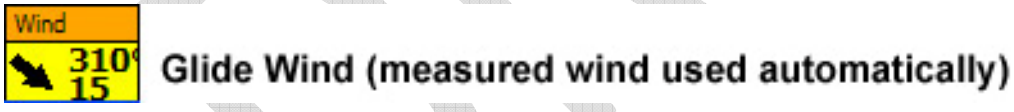


To enable or disable the *Numeric Wind Direction* option:

> *Menu* button / *Setup Menu Icon* / *Personal Preferences Tab* / *Map Display Options* / *Wind & Bearing* / *Numeric Wind Direction Checkbox*

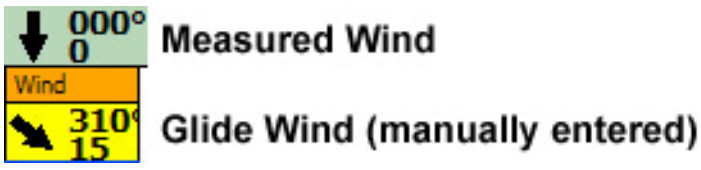
Automatic Wind

The default is for the *Measured Wind* to be automatically entered into the *Glide Wind Window*.



Manual Wind

When using manually entered wind data the *Measured Wind* data is presented directly above the manually entered data for use as a reference. You can manually enter the *Glide Wind* using the remote control.



To access the *Wind Set Window*:

> Press the *Focus* button once or twice until the *Numeric Information Area* at the bottom of the screen is in focus (not the *Selection Box*).

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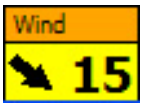
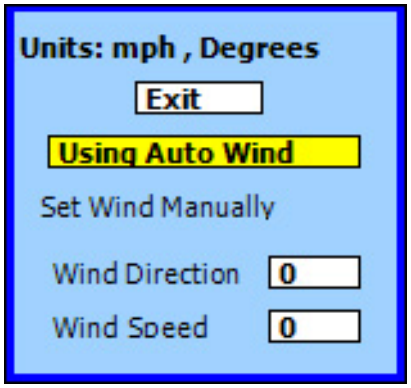
Press the *Left* and *Right* buttons to put the focus on the *Glide Wind Window.* 

Press the *Up*, *Down* or *Select* button and the *Wind Set Window* will appear.



Use the *Up* and *Down* buttons to move through the options in the *Wind Set Window*.

Press the *Select* button to activate the selected function or edit the highlighted numeric data.

To change to *Manual Wind Mode*

It is not necessary to use the Using Auto Wind / Using Manual Wind button to toggle to *Manual Wind Mode*. Pressing the Using Auto Wind button will change the mode over to *Manual Wind Mode*, but it is not necessary. You can simply go directly to the *Wind Direction* and *Wind Speed* numbers. As soon as you edit one of them the mode will automatically change to *Manual Wind Mode*. Changing the *Wind Speed* and/or *Wind Direction* is described below.

To change the *Wind Direction* or *Wind Speed*:

Use the *Up* and *Down* buttons to select the desired number.

Press the *Select* button to bring up the edit window.

Use the *Up* and *Down* buttons to adjust the number in small steps, and use the *Zoom In (+)* and *Zoom Out (-)* buttons to adjust the number in larger steps.

Press the *Select* button to finish editing the number and return to the *Wind Set Window*.

Press the *Menu*, *Focus* or Exit button to return to the moving map.

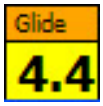
To change to *Automatic Wind Mode*

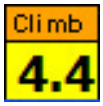
Use the *Up* and *Down* buttons to move through the options in the *Wind Set Window* and select the Using Manual Wind button.

Press the *Select* button to change to *Automatic Wind Mode*.

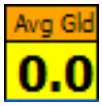
Press the *Menu*, *Focus* or Exit button to return to the moving map.

4.2.3.3 Vario Window

The *Vario Window* 

or 

or

or 

is found near the center of the lower edge of the moving map window. It can display several variometer values and is also used to display local time and set the UTC time offset and reset the variometer averagers.

Vario Window Display Options

The display options shown below are displayed in the climb units selected in the setup menus – such as knots or m/s.

- **Climb/Glide Netto**

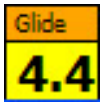
  This setting will display the *Glide Netto*

while cruising between thermals and the *Climb Rate in This Thermal*

while thermalling. The ClearNav switches between the 2 numbers automatically as you change flight modes – such as changing from *Cruise* to *Climb* mode or vice versa. There is a delay of a few seconds as you transition between flight modes because it takes a few seconds for the ClearNav to determine that you have changed flight modes.

Climb Rate in This Thermal

This is the average climb rate achieved in the current thermal.



Glide Netto

This is the average netto climb or sink achieved in the current glide. The term "netto" indicates that the sink rate at the current speed from glider's polar is added to the raw vario number so that the displayed number shows what the airmass is doing rather than the combination of airmass motion and glider sink rate. A value of zero indicates that the glide has (on average) been done in still air. A positive value indicates that the glide has been done (on average) in rising air. A negative number indicates that the glide has been done (on average) in sinking air. Theoretically, you will slow down in lift and speed up in sink and should be able to get a positive

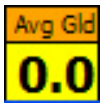
number to display most of the time as you "outsmart" the airmass.

Example Calculation:
As you cruise along on this glide the ClearNav is logging the difference between the current measured sink rate and the theoretical sink rate at the current speed from the polar. For example, for a single reading if the measured sink rate is 250 ft/minute and the polar gives a sink rate of 300 ft/min at the current speed then the netto value of +50 ft/min is recorded for this data point – indicating that the airmass is rising at 50 ft/min. The many numbers logged during this glide are averaged and the average is displayed.

-

  Average Climb

  This is the average climb rate since take-off – or since the start of the task. The number is automatically reset when the task is started because the data measured before the start of the task is likely to be very different from the data measured after the start of the task. Many pilots will find that this number is much lower than their best guess at their average climb rate. This number is theoretically a great number to use as a recommended *MacCready* setting.

- 

  Average Glide Netto

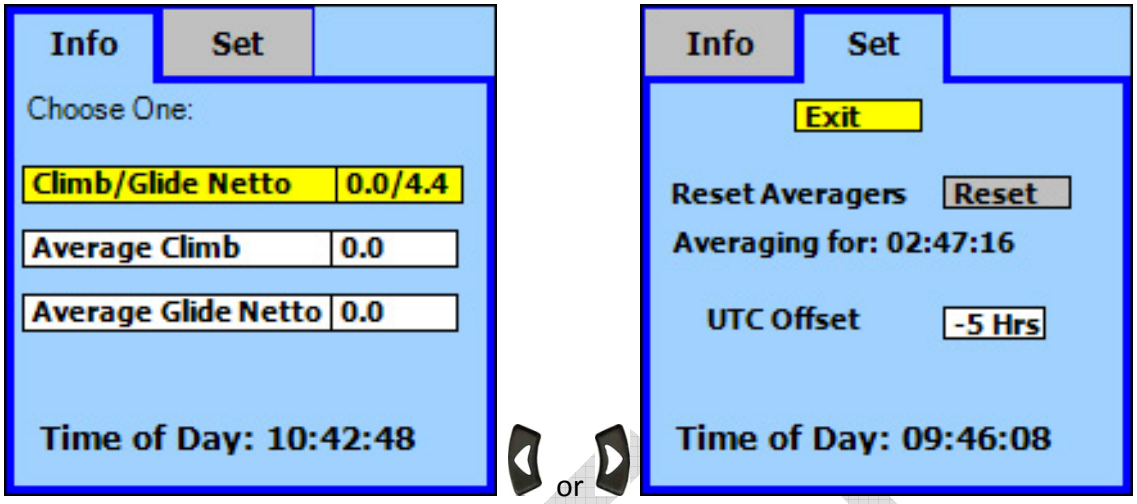
  This is the average netto climb or sink achieved in all glides since take-off – or since the start of the task. The number is automatically reset when the task is started because the data measured before the start of the task (while trying for minimum sink rather than cross-country speed) is likely to be very different from the data measured after the start of the task. The term "netto" indicates that the sink rate at the current speed from glider's polar is added to the raw vario number so that the displayed number shows what the airmass is doing rather than the combination of airmass motion and glider sink rate. A value of zero indicates that the glides have (on average) been done in still air. A positive value indicates that the glides have been done (on average) in rising air. A negative number indicates that the glides have been done (on average) in sinking air. Theoretically, you will slow down in lift and speed up in sink and should be able to get a positive number to display most of the time as you "outsmart" the airmass.

To access the *Vario Display Options Window*:

Press the *Focus* button once or twice until the *Numeric Information Area* at the bottom of the screen is in focus (not the *Selection Box*).

Press the *Left* and *Right* buttons to put the focus on the *Vario Window.*

Press the *Up*, *Down* or *Select* button and the *Vario Display Options Window* will appear.



Use the *Up* and *Down* buttons to move through the options in the *Vario Settings Window*.

Use the *Left* and *Right* buttons to move between the *Info* and *Set* tabs.

Press the *Select* button to activate the selected function or edit the highlighted numeric data.

Press the *Menu*, *Focus* or Exit button to return to the moving map.

As you can see in the images above, the *Time of Day* is displayed in both the *Vario Settings – Info Window* and the *Vario Settings – Set Window*. Be sure to set the *UTC Offset* in the *Vario Settings – Set Window* for your current location – otherwise the *Time of Day* will not display correctly.

4.2.3.4 Task Window

The *Task Window* No Start or Since Start 00:00:18 or To Finish 03:13:44 or Total Time 03:16:59 or Dist. To Go 195 is located near the right side of the bottom or the map screen – to the left of the *Altitude Window*. It can be used to display several task related parameters and also to access the *Task Window – Task Tab* and *Task Window – Action Tab* windows. The *Task Window – Action Tab* window can be used to start the task, select the next leg of the task, select the display of final glide to finish (around all remaining turnpoints) data, view task and vario data and view and edit the *Predicted Speed* around the remainder of the task.

Task Window Display Options

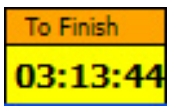
There are several different parameters which can be selected for display in the *Task Window* at the bottom of the map screen.

-

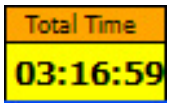
"No Start" is displayed if no task has been started.

-

Since Start
The time *Since Start* is the time in hours, minutes and seconds (hh:mm:ss) since the task was started.

- 

To Finish
The time *To Finish* is the estimated time in hours, minutes and seconds (hh:mm:ss) remaining until the task is finished. The time *To Finish* is estimated by dividing the *Distance To Go* by the *Predicted Speed*.

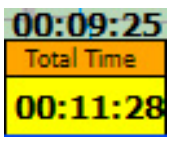
- 

Total Time
The *Total Time* is the estimated time from start to finish to complete the task. It is calculated by adding the *Time Since Start* to the *Time To Finish*. This number is extremely useful when flying tasks that have a minimum task time. You may want to display this number when flying contest tasks. As long as the *Total Time* is longer than the minimum task time assigned by the contest managers, you are doing fine. If the *Total Time* is less than the minimum task time then you may need to fly farther into turn areas or add turnpoints to free tasks.

-

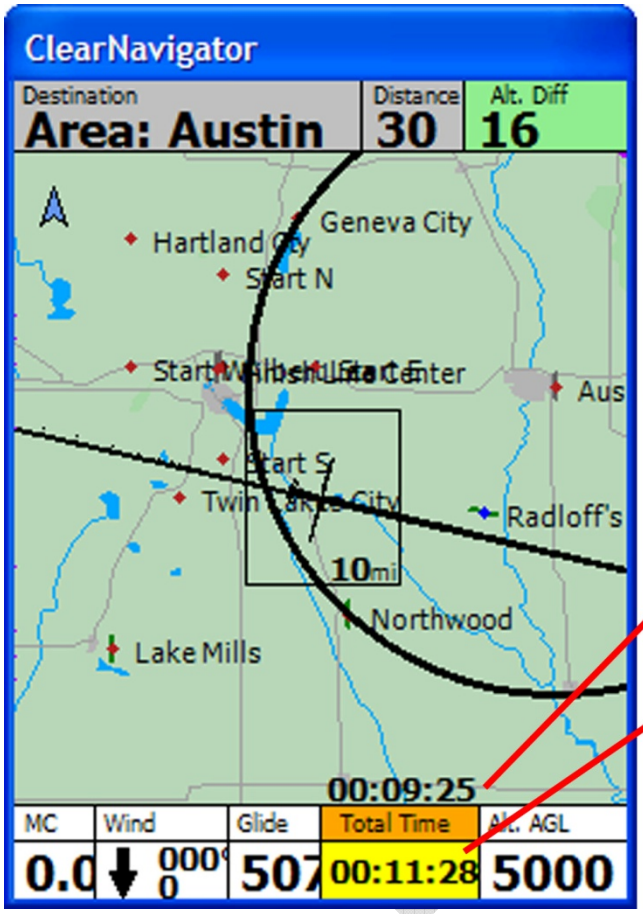
Distance To Go
The *Distance To Go* is the distance from your current location around all remaining task turnpoints to the finish point. The units are the distance units selected in the setup screens – such as miles or kilometers.

Number Displayed When In Last Turn Area



There is an additional number displayed above the *Task Window* when you are in the final turn area of

the task. It is the *Total Task Time If You Turn Here*. It is shown regardless of which of the parameters you select for display in the *Task Window*. This is a fantastic feature! If you are displaying the *Total Time* in the *Task Window* it will show the total task time if you fly to the turnpoint shown on the map. The *Total Task Time If You Turn Here* is the total task time if you turn for home now. By comparing those 2 numbers to the minimum task time you will know exactly when to turn for home. We recommend waiting until the *Total Task Time If You Turn Here* is 3 to 5 minutes over the minimum task time – to make sure you make sure you don't get home early. The screen image below should help clarify the 2 numbers. The time numbers are low in the example below because the simulator was blazing around the task at 1000 mile/hour. They will be in hours and minutes for real soaring tasks rather than minutes and seconds as shown below.



In Last Turn Area:

Total Task Time if you turn for home now

Total Task Time if you go to the turnpoint shown on the map

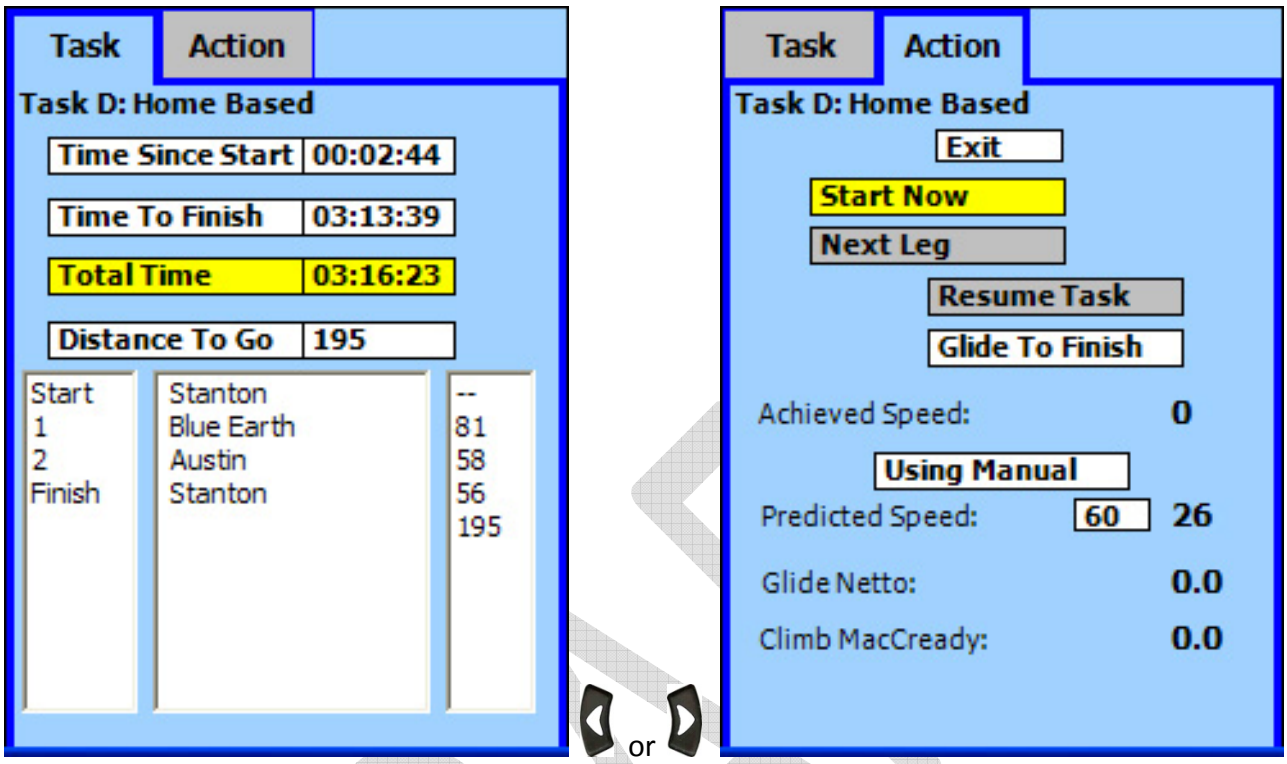
To change the data displayed in the *Task Window* or to access the *Task Window – Info Tab* or *Task Window – Action Tab*:

Press the *Focus* button once or twice until the *Numeric Information Area* at the bottom of the screen is in focus (not the *Selection Box*).

Press the *Left* and *Right* buttons to put the focus on the *Task Window*.

Press the *Up*, *Down* or *Select* button and the *Task Window – Task Tab* or *Task*

Window – Action Tab will appear.



Use the *Up* and *Down* buttons to move through the options in the *Task Window – Task Tab.*

Use the *Left* and *Right* buttons to move between the *Task* and *Action* tabs.

Press the *Select* button to activate the selected function or edit the highlighted numeric data.

Press the *Menu*, *Focus* or Exit button to return to the moving map.

4.2.3.4.1 Task Window – Task Tab

The *Task Tab* is used to select the data to display in the *Task Window* and to view the active task. You can also view all the available parameters in one screen – even the parameters that are not selected for display on the map screen.

4.2.3.4.2 Task Window – Action Tab

The *Action Tab* is used to start the task, cancel the task, move on to the next leg of the task, resume a task that has been suspended, edit predicted task speed, view vario data, etc.

- ***Start Now / Exit Task* Button**
  This button is used to either start or exit the task setup in the setup menus. The task will start automatically when you exit the start cylinder or cross the start line – so you should never really

need to press the *Start Now* button. The only reason use the *Start Now* button would be if you wanted to start without going through the start gate or across the start line, or if you had started but for some reason (GPS issue..?) the ClearNav did not think you had started. Once the task starts the button changes from *Start Now* to *Exit Task*. The *Exit Task* button is used to exit the task if you decide to re-start or abandon the task.

- ***Next Leg / Turn Here?*** **Button**
  The *Next Leg b*utton is used to move on to the next leg of the task. For example, if you are currently navigating to the first turnpoint and have just rounded the turnpoint you would press the *Next Leg* button to tell the ClearNav to start navigating to the next turnpoint in the task. The ClearNav will automatically switch to the next leg when you enter the turn cylinder of an assigned task, but it will not automatically switch when flying an area task – because you will probably want to continue flying into the turn area rather than moving on as soon as you enter the turn area. The button changes to a *Turn Here?* button when you enter into a turn area. When you select the *Turn Here?* button the task is redrawn with that point as the turnpoint and the active waypoint is changed to the next waypoint in the task. After the *Turn Here?* button is pressed, it turns into an *Undo Turn Here* button. Select the *Undo Turn Here* button to resume navigation to the calculated ideal turnpoint.
- ***Resume Task*** **Button**
  The *Resume Task* button is used to resume the task after it has been suspended. The task is suspended any time you start navigating to a non-task turnpoint. For example, if you are getting low and use the *Selection Box* to fly to a nearby airport, the task will be suspended. When the *Resume Task* button is pressed the ClearNav will resume navigating to the waypoint that it was navigating to when the task was suspended.
- ***Glide To Finish / Glide To Next WP*** **Button**
  The *Glide To Finish* button makes it possible to display final glide information around multiple turnpoints to the finish. The ClearNav will continue navigating to the current task turnpoint, but the *Final Glide Window*

will no longer display the differential final glide to the next turnpoint. It will display the final glide around the remaining task turnpoints to the finish. Also, the *Distance Window*

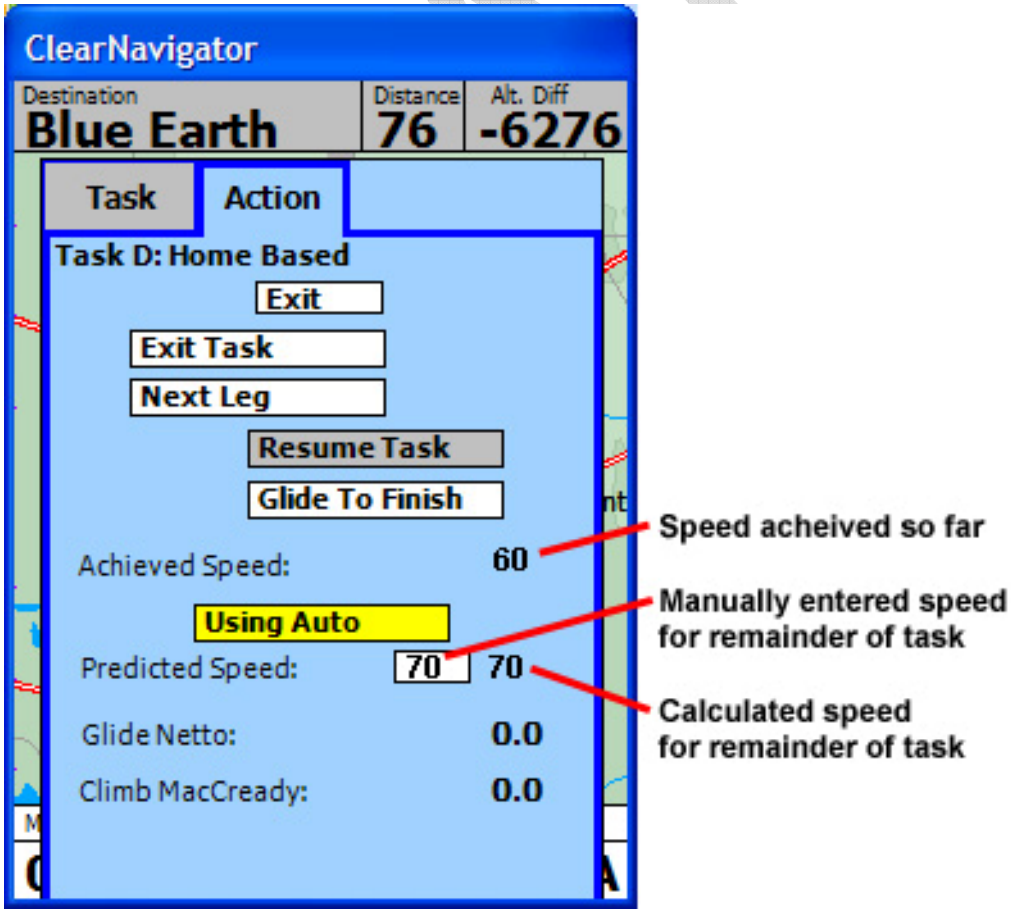
will show the distance around the remainder of the task. There is no change in the text description in the *Final Glide Window* – instead, the Destination Window changes to "To Finish"

to indicate that the final glide calculation is to the finish point. The other indicator that you are displaying the *Glide To Finish* number in the *Final Glide Window* is that the *Glide To Finish* button will change into the *Glide To Next* WP (waypoint) button. Press the *Glide To Next WP* button to resume displaying the final glide and distance to the active task waypoint.
- ***Achieved Speed***
  The *Achieved Speed* is the speed achieved from the start to your current position. It is a good reference for helping to calculate the *Predicted Speed* for the remainder of the task, but it is

important to remember that the *Achieved Speed* will probably be quite a bit slower than the speed you attain during the remainder of the task. That is because you will not be stopping to thermal when on final glide which will make your average speed go up significantly for the last part of the task. The *Predicted Speed* automatically takes the final glide into account making it unnecessary to try to use the *Achieved Speed* to manually calculate the speed for the remainder of the task.

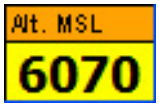
DRAFT

- ***Using Auto / Using Manual* Button**
  The *Using Auto / Using Manual* button is connected to the *Predicted Speed* values that are displayed below it. When it is highlighted press the *Select* ⏺ button to toggle between manual and automatic calculation of the *Predicted Speed*. The default is *Using Auto*. The ClearNav always automatically calculates *Predicted Speed* using your climb and glide performance to this point and taking into account the final glide portion of the flight during which the average speed will increase because you won't be stopping to thermal. The automatically calculated speed is always displayed on the far right edge of the screen. The manually entered number is displayed in an edit box to the left of the automatically calculated number. In *Using Auto* mode the calculated speed is automatically bumped into the "manual" speed position. When in *Using Manual* mode the calculated speed can be used as a reference and you can manually set the *Predicted Speed*. Most pilots will probably use the *Using Auto* mode most of the time. A good example of when it makes sense to manually enter the predicted speed is when you know that you will be flying much faster or slower for the remainder of the task due to changes in the weather or type of soaring flight – such as a cloud street or isolated storm up ahead or a transition to ridge running or wave flight. When it *Using Auto* mode, manually editing the *Predicted Speed* will change the mode to *Using Manual* mode.



4.2.3.5 Altitude Window

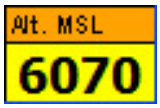
The *Altitude Window*

or 

or

is displayed in the lower right corner of the screen. It can display several altitude numbers and can be used to access the *Set MSL Tab*.

Altitude Display Options

- 

  Altitude MSL (Mean Sea Level)

  The *Altitude MSL* is the altitude that has been adjusted to compensate for changes from the standard atmosphere. You can and should edit the *Altitude MSL* before takeoff every time you fly by setting it to match the known airport elevation. **This number is the one used for the final glide calculations – so be sure to set it before takeoff.** The *Altitude AGL* (below) is based on the *MSL Altitude* so it will only display accurately if the *MSL Altitude* is set accurately. You can easily use a local automated weather transmitter (AWOS) pressure setting to adjust the *MSL Altitude* in flight.

-

  Pressure Altitude

  The *Pressure Altitude* is the raw altitude from the pressure transducer and shows the altitude in a standard atmosphere. Since the local barometric pressure is not likely to match the standard atmosphere this number will be different than the *MSL Altitude*. This number is used when near special use airspace such as when near 18,000 feet in the USA.

-

  Altitude AGL (Above Ground Level)

  The *Altitude AGL* is the approximate altitude above ground level. This is a very powerful feature because it makes it easy to know your approximate altitude above the terrain at a glance. You will find the Altitude AGL especially useful when flying in mountainous areas. Of course, the elevation model is not perfect, so don't count on this number to warn you about local objects that stand up above the general terrain elevation. The *MSL Altitude* is used to calculate the *Altitude AGL* so it is important to set the *Altitude MSL* before takeoff. The *Altitude AGL* is calculated by subtracting the ground elevation (from the built-in ground elevation model) from the *Altitude MSL*.

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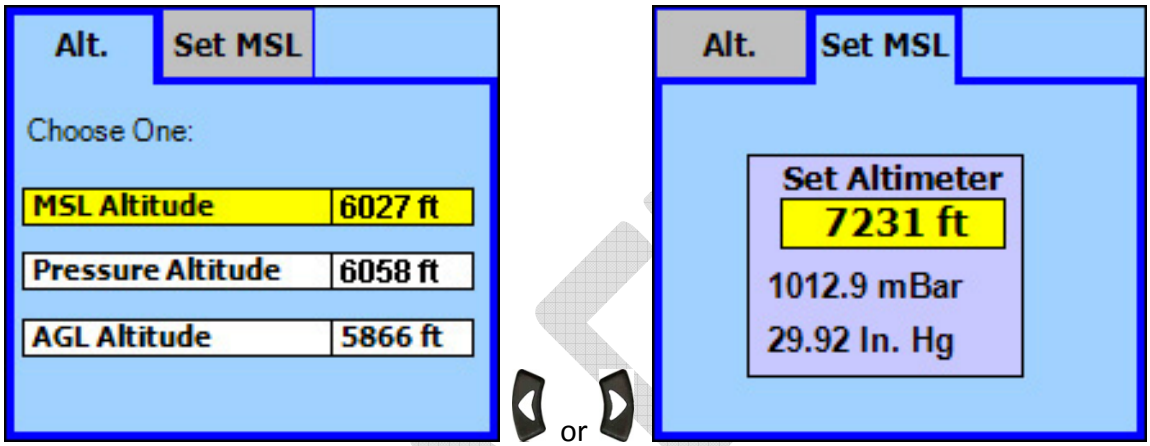
To change the data displayed in the *Altitude Window* or to access the *Alt. Tab* or *Set MSL Tab*:

Press the *Focus* button once or twice until the *Numeric Information Area* at the bottom of the screen is in focus (not the *Selection Box*).

Press the *Left* and *Right* buttons to put the focus on the *Altitude Window*.

Press the *Up*, *Down* or *Select* button and the *Alt. Tab or Set MSL Tab* will appear.



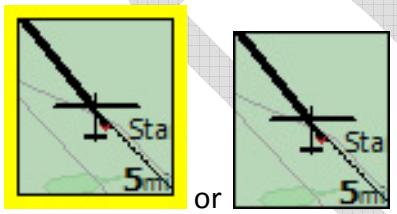
Use the *Up* and *Down* buttons to move through the display options in the *Alt. Tab.*

Use the *Left* and *Right* buttons to switch between the *Alt.* and *Set MSL* tabs.

Press the *Select* button to activate the selected function or edit the highlighted numeric data.

Press the *Menu*, *Focus* or Exit button to return to the moving map.

4.2.4 The *Selection Box*



The *Selection Box* is displayed in the center of the map display. It is used to:

- Pan the moving map display with the *Up*, *Down*, *Left* and *Right* buttons
- Select a turnpoint so that you can view details on it or start navigating to it (Goto) or add it to the active task
- Select an airspace and view details on it or turn it off for 12 hours
- The distance number in the bottom right corner of the box indicates the width of the entire map screen (not the width of the box)

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Activating the *Selection Box* (making it yellow)
The *Selection Box* is highlighted with a yellow border when it is active. To activate it press the *Focus* button once or twice.

4.2.4.1 Pan the Moving Map Display

To Pan the map screen is to move it around (as if sliding a map across the top of a table) so you can see regions of the map that were not previously in view.

To Pan the moving map screen:

Press the *Focus* button once or twice until the yellow box is displayed around the *Selection Box*

Use the *Up*, *Down*, *Left* and *Right* buttons to pan the map

To reset the pan back to the current location:

Press the *Focus* button or *Menu* button

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4.2.4.2 To View Data on a Nearby Turnpoint and Start Navigating to it

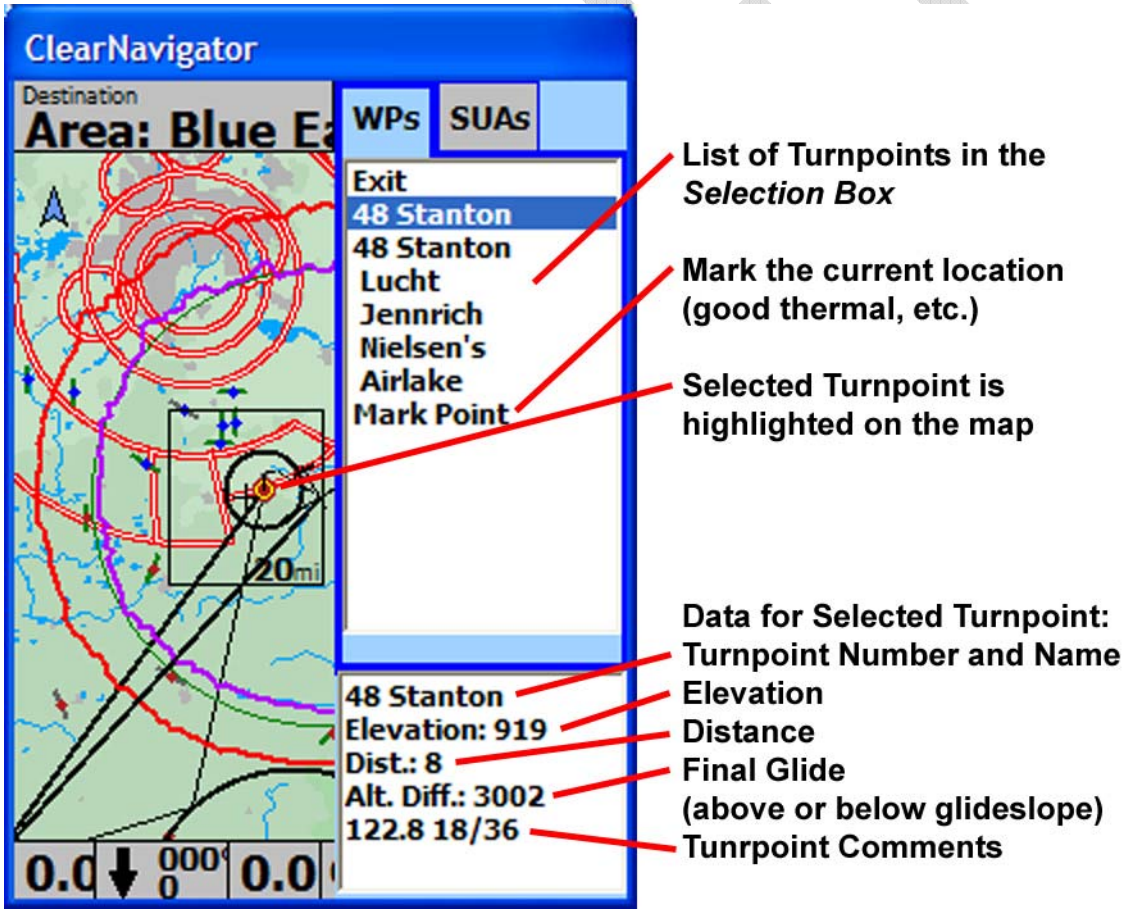
The *Selection Box* makes it easy to select a nearby airport and start navigating to it. To do so:

Press the *Focus* button once or twice until the yellow box is displayed around the *Selection Box*

Use the *Up*, *Down*, *Left* and *Right* buttons to move the *Selection Box* around the desired turnpoint. It is OK to have multiple turnpoints in the box as you will get the opportunity to select the desired turnpoint from a list of the turnpoints that are in the box. You can pan the map in any direction by moving the *Selection Box* off the edge of the map.

Press the *Select* button. A list of the turnpoints in the box will be displayed.

If desired, use the *Left* and *Right* buttons to switch between the *WPs* and *SUAs* tabs.



Use the *Up*, *Down* buttons to move through the list of turnpoints. Note that data for the selected airport is shown at the bottom of the screen.

Press the *Select* button to start navigating to the selected turnpoint.

Press the *Focus* or Exit button to return to the moving map.

4.2.4.3 Create a *Mark Point*

A *Mark Point* is a waypoint that is created using the *Selection Box*. If you have not moved the *Selection* Box the *Mark* Point will be created at the current location of the glider. If you have moved the *Selection* Box is created at the location of the cross-hair ("+") at the center of the *Selection Box*. It is often used in flight to mark the location of a good thermal so you can find it again in the future. It can also be used to create points before flight. However, *Mark Points* do not appear on the list of waypoints used for creating tasks – so it is not possible to create a task using *Mark Points*.

Every time you add a new *Mark Point* it is saved into the current waypoint file so that it will appear the next time you fly. Each new *Mark* Point is given a new name – such as "Marked Point 1", "Marked Point 2", etc. The only way to delete a *Mark Point* is to copy the waypoint file to a PC and edit the waypoint file manually. There may be a way to delete a *Mark Point* using the ClearNav in the future.

To create a *Mark Point*:

Press the *Focus* button once or twice until the yellow box is displayed around the *Selection Box*

Use the *Up*, *Down*, *Left* and *Right* buttons to put the *Selection Box* around the desired turnpoint. It is OK to have multiple turnpoints in the box as you will get the opportunity to select the desired turnpoint from a list of the turnpoints that are in the box.

Press the *Select* button. A list of the turnpoints in the box will be displayed.

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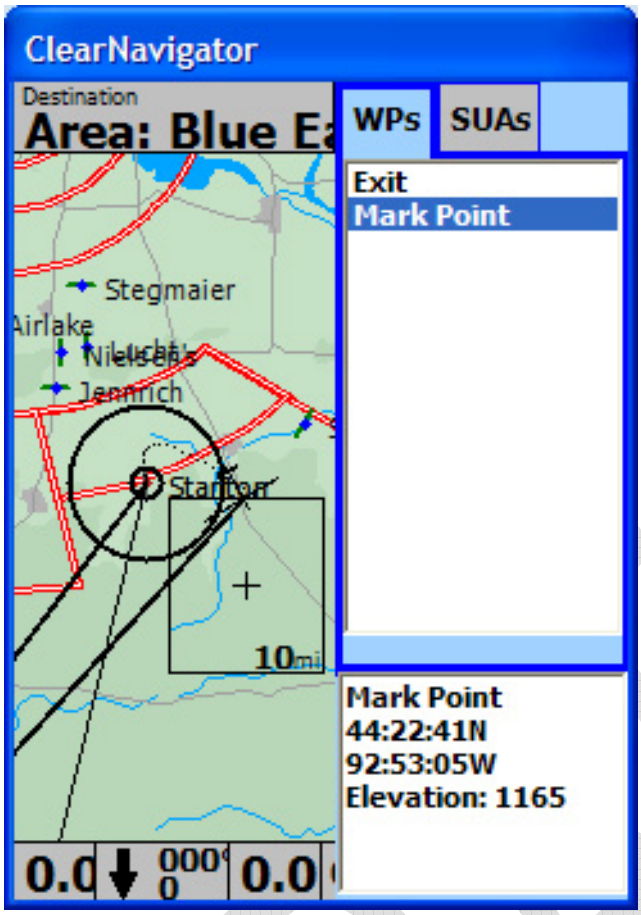
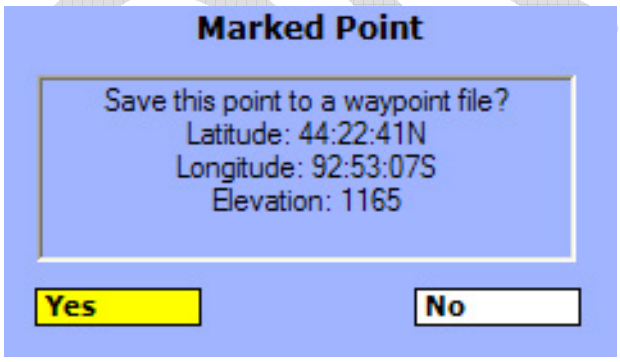
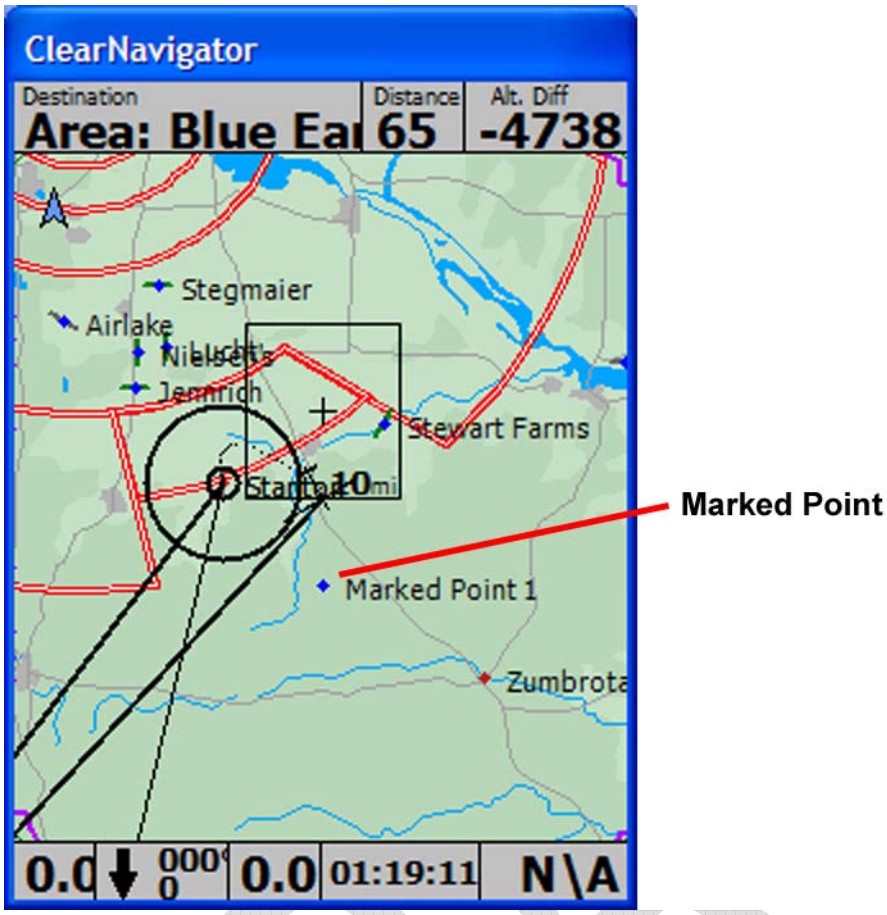


Use the *Up* , *Down* buttons to select "Mark Point" at the bottom of the list of turnpoints.

Press the *Select* button to mark the point.



Use the *Left* and *Right* buttons to select "Yes" to save the new *Mark Point* or "No" to cancel.



The image above shows how a *Mark Point* looks on the map.

4.2.4.4 To View or Disable Nearby Airspace

The *Selection Box* can be used to view details on local airspace or disable or re-enable airspace. To do so:

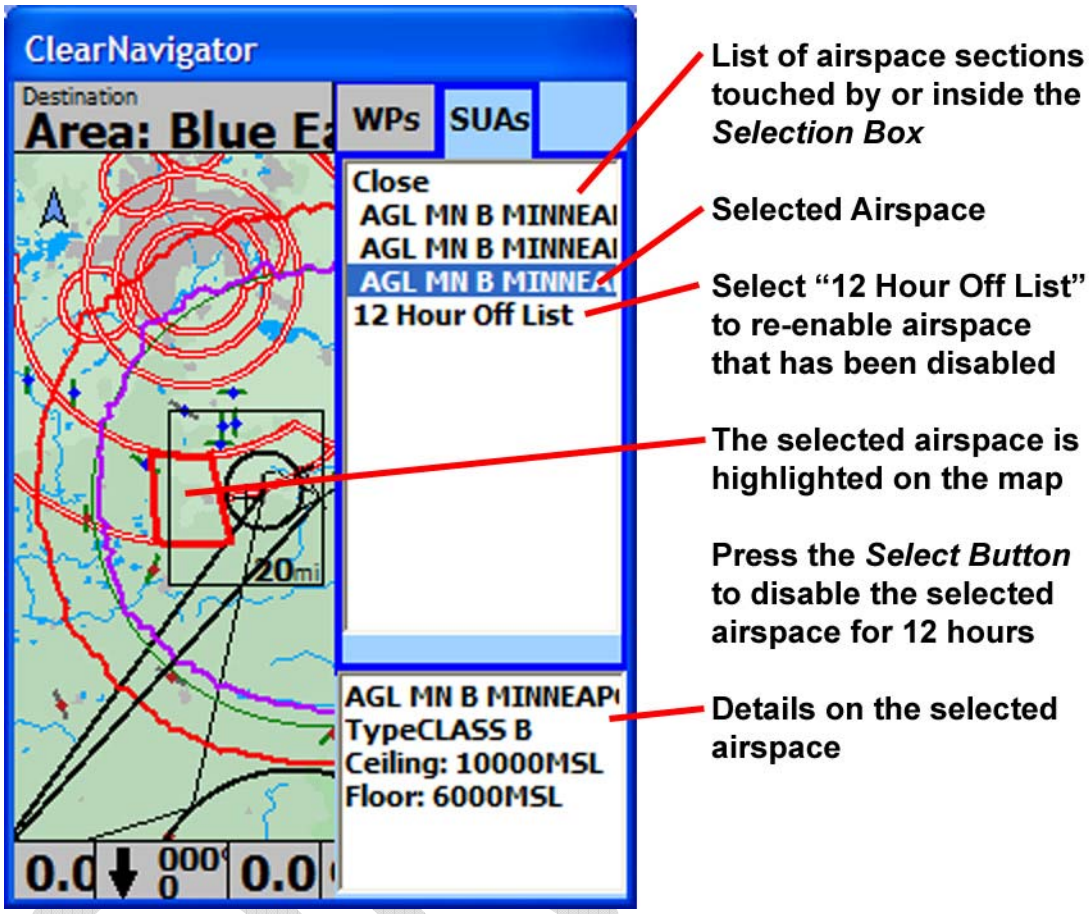
Press the *Focus* button once or twice until the yellow box is displayed around the *Selection Box*

Use the *Up*, *Down*, *Left* and *Right* buttons to move the *Selection Box* over the desired airspace section. It is OK to have multiple airspace sections in the box as you will get the opportunity to select the desired airspace from a list of the airspace sections that are in the box. The airspace you are interested in does not need to be completely enclosed by the *Selection* Box. You can pan the map in any direction by moving the *Selection Box* off the edge of the map.

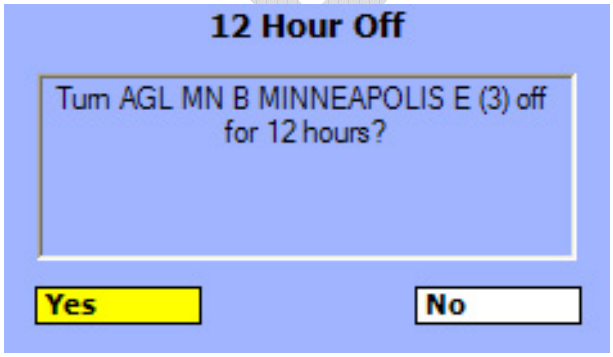
Press the *Select* button. A list of the airspace sections touched or inside the box will be displayed.

Use the *Right* button to switch to the *SUAs* tab.

Use the *Up*, *Down* buttons to move through the list of airspace sections. Note that data for the selected airspace section is shown at the bottom of the screen.



Press the *Select* button to disable the selected airspace for 12 hours. A confirmation dialog will give you the option to continue or cancel (see below). Press "Yes" to disable it or "No" to cancel. It will not be deleted from the airspace data file – it will only be disabled for 12 hours. It will automatically appear the next time you power-up the ClearNav.



4.2.4.5 To Re-Enable Airspace that has been Disabled:

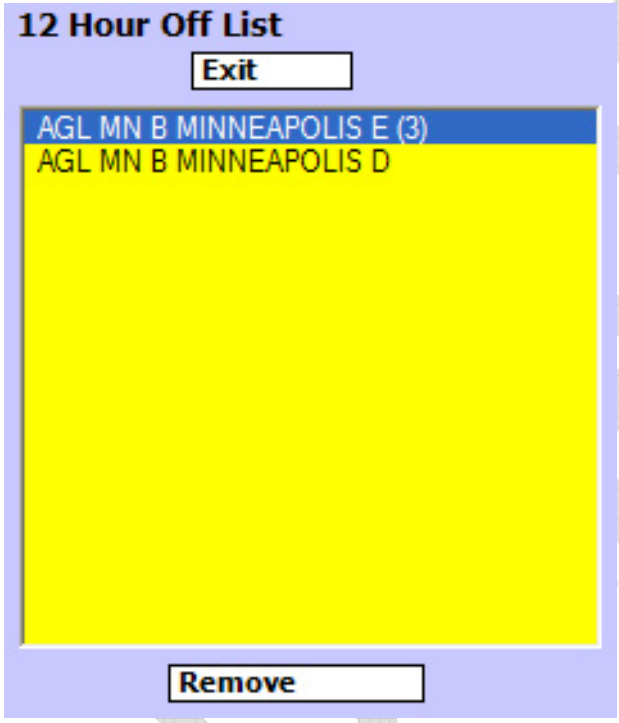
Press the *Focus* button once or twice until the yellow box is displayed around the *Selection Box*

Press the *Select* button.

Use the *Right* button to switch to the *SUAs* tab.

Use the *Down* button to move down to the "12 Hour Off List" item.

Press the *Select* button. The *12 Hour Off List* will be displayed.



Use the *Up*, *Down* buttons to select the airspace you want to re-enable.

Press the *Select* button to select it. The *Remove* button will be highlighted.

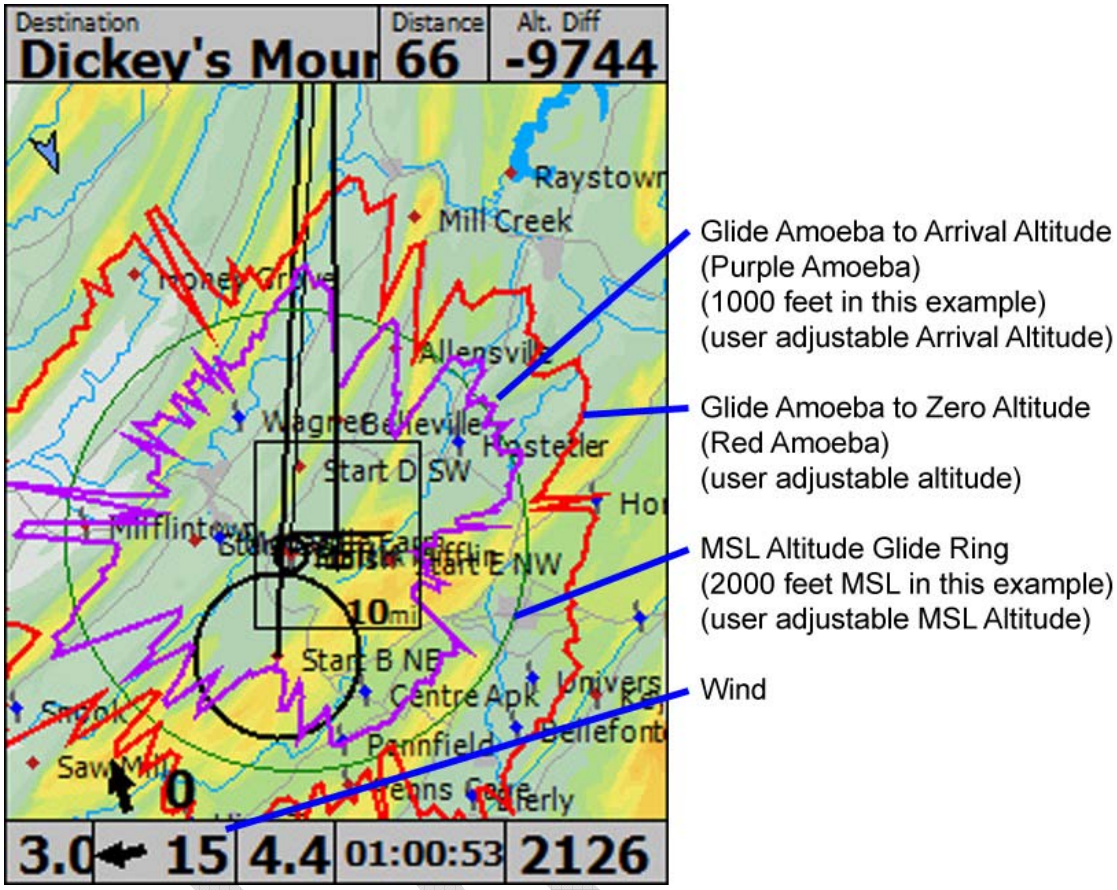
Press the *Remove* button to remove it from the *12 Hour Off List* – which re-enables it.

If desired, select and remove other airspace sections in the same fashion.

Press the *Focus* or Exit button to return to the moving map.

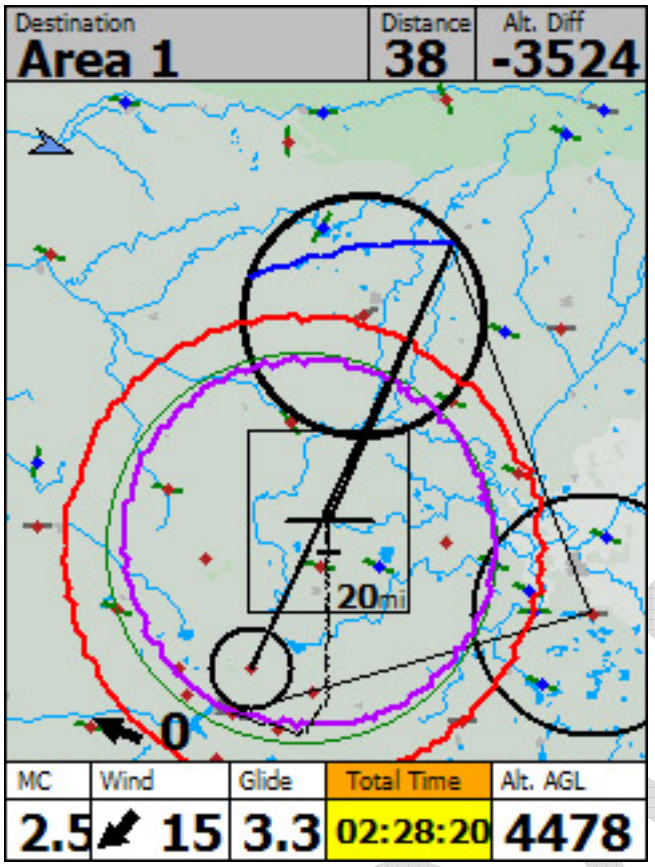
4.2.5 Glide Amoebae

The *Glide Amoebae* (plural form of Glide Amoeba) are powerful graphical display items which make it obvious at a glance how far you can glide in any direction. Any airport or field that is inside the *Glide* Amoebae is within glide range. There are 2 *Glide Amoebae* displayed on the map. The arrival altitudes for each *Glide Amoeba* are adjustable. There is also an optional *MSL Altitude Glide Ring* which is described in the next section.



Example showing the *Glide Amoebae* in mountainous terrain

As you can see in the image above the *Glide Amoebae* can take on strange "amoeba-like" shapes when flying in mountainous terrain. The purple *Glide Amoeba* has a flat spot on the top left side where a mountain ridge is located. The points where the *Glide Amoeba* shoots out (such as at the left side) is where there is a mountain pass that can be glided though and on into the valley beyond.



Example showing the Glide Amoebae in flat terrain

In flat terrain the *Glide Amoebae* are simple circles that are offset by the wind.

The *Glide Amoebae*'s location is calculated using:

- The glider's polar
- The wind speed and direction
- The glider's *MSL Altitude*
- The elevation of the surrounding terrain
- The glider's airspeed – The final glide calculations are based on total energy final glide. As you fly faster your glider has more energy and could pull up to gain altitude and range. For example, if 2 identical gliders were at the same location and altitude but different airspeeds, the one at high airspeed would have more energy and could pull up to gain more altitude. Therefore the *Glide Amoebae* for the glider at high speed would be displayed farther away from the glider than the *Glide Amoebae* of the glider at lower airspeed.

To access the settings for the *Glide Amoebae* go to:

Menu button / *Setup Menu Icon* / *Personal Preferences Tab* / *Final Glide Settings*

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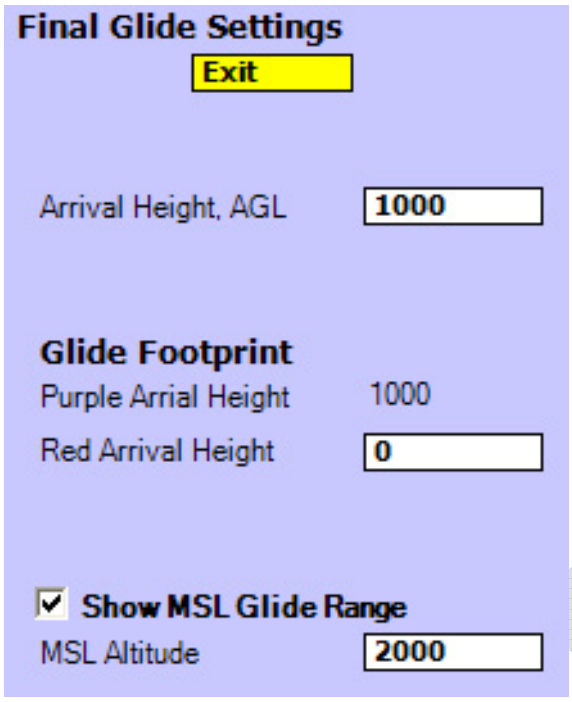
Final Glide Settings
Exit
Arrival Height, AGL
1000
Glide Footprint
Purple Arrial Height
1000
Red Arrival Height
0
Show MSL Glide Range
MSL Altitude
2000

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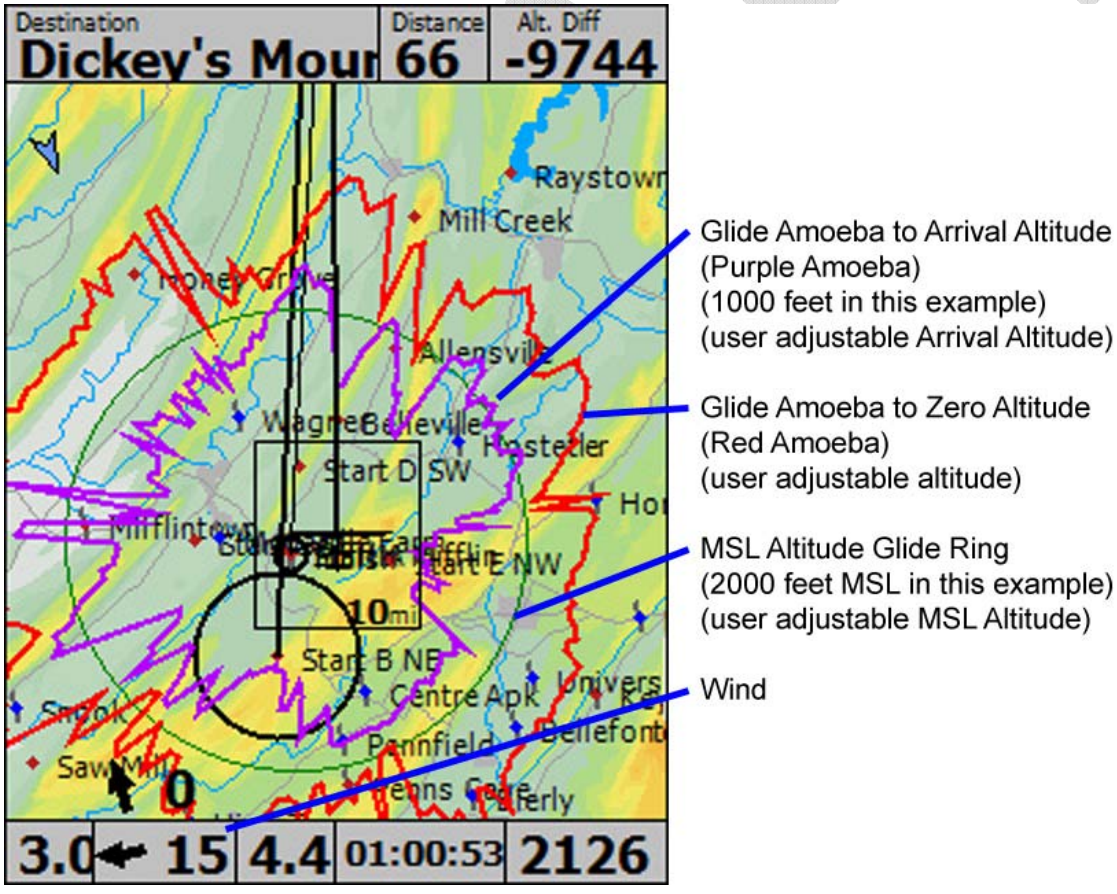
4.2.6 MSL Altitude Glide Ring

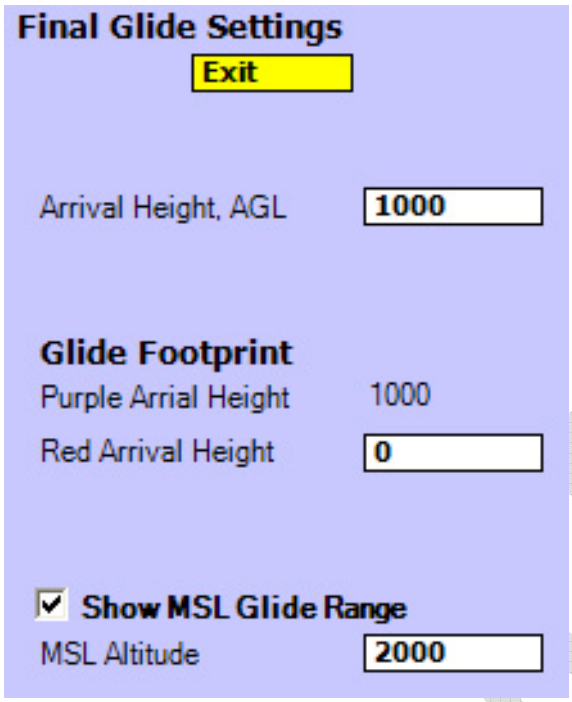
The *MSL Altitude Glide Ring* can be displayed on the map to show how far you can glide descending down to the user selected MSL Altitude. This option is a neat idea, but we aren't sure yet how useful it will be. If you don't use it we recommend turning it off to limit the amount of information on the map. In still air you can glide from your current location all the way to the *MSL Altitude Glide Ring*. You will arrive at the ring at the user selected MSL Altitude. The ring will only display when the glider is at an altitude that is higher than the user selected *MSL Altitude* entered for the *MSL Altitude Glide Ring.* As you increase the number entered in the *MSL Altitude* the ring will get closer to the glider because the difference in altitude will get smaller.

The *MSL Altitude Glide Ring* may be useful is when trying to overfly an airspace region. For example, if there is airspace nearby that has a ceiling of 3000 feet MSL, you could set the *MSL Altitude Glide Ring* to 3000 feet (or 3200 feet to be conservative). If the airspace you want to fly over is completely inside the *MSL Altitude Glide Ring* then you know that you can glide over it. If the airspace region extends beyond the *MSL Altitude Glide Ring* then you know that you can't make it all the way across the airspace region without descending down into it.



To access the settings for the *MSL Glide Ring* go to:

Menu button / *Setup Menu Icon* / *Personal Preferences Tab* / *Final Glide Settings*



4.2.7 Area Task Blue Arcs

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4.2.8 Airspace Warning Window

4.3 Using the map

4.3.1 Change Destination

4.3.1.1 Using the Waypoint List

4.3.1.2 Using the Map

4.3.1.2.1 Finding Information on Nearby Waypoints and Airspace

5 How To – File Transfers and Upgrades

5.1 Transfer Flight Logs from the ClearNav to the PC

5.1.1 Transferring Flight Logs from the ClearNav to the USB Flash Drive

At the end of the flying day you simply plug the USB Flash Drive into the ClearNav's panel mounted USB connector and use the ClearNav's *Personal Preferences / Flight Recorder* menu to select and transfer the desired flight logs from the ClearNav's memory to the USB Flash Drive.

5.1.2 Transferring Flight Logs from the USB Flash Drive to your PC or Mac

You will probably want to transfer your flight logs to your home or laptop computer to backup the files and view the flight log in 3D using a program like SeeYou or StrePla. When you plug the USB Flash Drive into your computer the computer should recognize the drive in a few seconds and give you the option to view the files. Windows will open the Windows Explorer (My Computer) program and display the files on the USB Flash Drive. You can then copy the files onto your computer's hard drive. We recommend copying the flight logs into a "My Documents/Flights" folder.

5.2 Transferring Waypoint and Airspace Files from the PC to the ClearNav

A USB Flash Drive is used to transfer files from your home or laptop computer to the ClearNav. You will want to transfer waypoint and airspace files for your region to the ClearNav before using it for the first time, and every time you bring it to a new soaring site. The ClearNav can store waypoint and airspace files for many soaring sites in its internal memory. Creating or downloading waypoint files and airspace files is covered in the Waypoint Files and Airspace Files sections.

5.2.1 Transferring Waypoint and Airspace Files from your Computer to the USB Flash Drive

The first step is to transfer the desired files from your computer to the USB Flash Drive. When you plug the USB Flash Drive into your computer the computer should recognize the drive in a few seconds and give you the option to "Open Folder to view files with Windows Explorer". Click OK. Windows will then open the Windows Explorer (My Computer) program and display the files on the USB Flash Drive.

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You can then copy the files from your computer's hard drive onto the USB Flash Drive. Waypoint files should be copied into the "Map Data/Waypoints" directory on the USB Flash Drive. Airspace files should be copied into the "Map Data/SUAs" directory on the USB Flash Drive. The files need to be in those directories for the ClearNav to access them.

5.2.2 Transferring Waypoint and Airspace Files from the USB Flash Drive to the ClearNav

Transferring the waypoint and airspace files from the USB Flash Drive to the ClearNav is very easy.

1. Plug the USB Flash Drive into the ClearNav's panel mounted USB connector
2. Power-up the ClearNav. The ClearNav automatically transfers the files from the USB Flash Drive to the ClearNav's internal memory.

5.3 Upgrading the Firmware and Software in the ClearNav

The term *Firmware* is used to describe the software that runs the operating system and hardware drivers in the ClearNav. The term *software* will be used in this manual when referring to the actual ClearNav application. The term firmware was created to clarify that the software is pre-installed by the manufacturer. A decade or 2 ago firmware was usually programmed into a memory chip at the factory. But today firmware and software can often be downloaded from the internet and transferred to a device to give it new functionality. That is an advantage for those of us using the products because we can upgrade them in a few minutes without the need to send the unit back to the factory for an upgrade. You do not need to worry about which files are firmware and which are software. You only need to download new files to the USB Flash Drive and the ClearNav will automatically pull in the files it needs. To upgrade the firmware and/or software in the ClearNav you need only a USB Flash Drive.

5.3.1 Downloading the Firmware and Software Upgrade Files to your Computer

ClearNav firmware and software upgrade files will be available on the NK web site. Download the files to your computer. They will probably be saved in a Zip file. Unzip the files directly into the root directory on the USB Flash Drive. The root directory is the highest level directory.

5.3.2 Transferring Firmware and Software Files from the PC to the USB Flash Drive

Unzip the files directly into the root directory on the USB Flash Drive. The root directory is the highest level directory. To unzip the files click on the zip file. Select all the files in the list and click the "Extract" button. A window will appear for you to select the destination for the extracted files. Select the root directory of the USB Flash Drive as shown below and press the "Extract" button.

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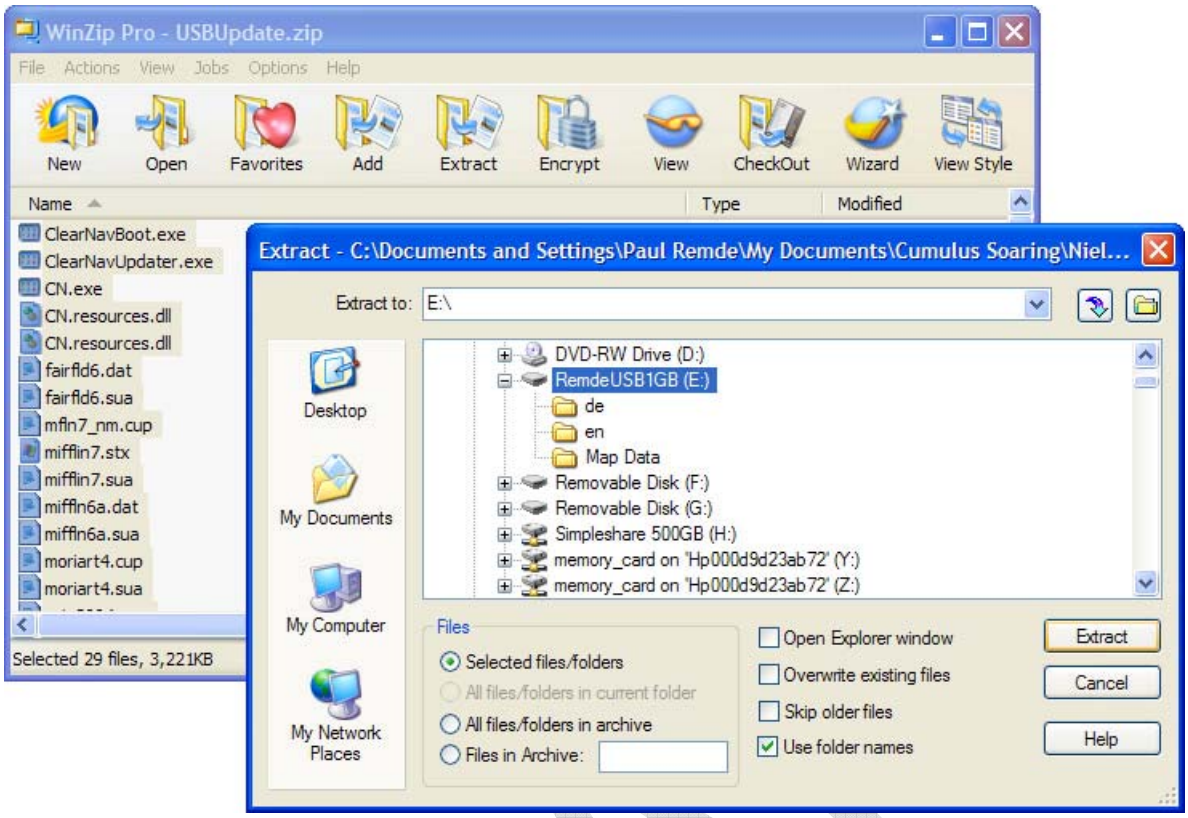

5.3.3 Transferring Firmware Files from the USB Flash Drive to the ClearNav

Transferring the firmware and software files from the USB Flash Drive to the ClearNav is very easy.

1. Power-down the ClearNav
2. Plug the USB Flash Drive into the ClearNav's panel mounted USB connector
3. Power-up the ClearNav. The ClearNav automatically transfers the files from the USB Flash Drive to the ClearNav's internal memory.

6 How To – Flying with the ClearNav

6.1 First Time Setup

6.1.1 Copy Waypoint and Airspace Files onto ClearNav

6.1.2 Power-up ClearNav

6.1.3 Select desired waypoint file

6.1.4 Select desired airspace file

6.1.5 Set UTC Time offset in the NIA info/Set window

6.1.6 Setup Pilot Preferences in the Pilot Preferences menu

6.1.6.1 Pilot Name

6.1.6.2 Final Glide Settings

6.1.6.3 Map Display Options

6.1.6.4 Units

6.1.6.5 Language

6.1.7 Enter Pilot Name and glider data for logger

6.1.8 Select Task Start, TP and Finish Rules

6.1.9 Select the desired Task Type

6.1.10 Enter a task

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6.2 A Typical Day at the Gliderport

6.2.1 Power up

6.2.2 Enter a task or two

6.2.3 Fly a task

6.2.4 After landing – transfer the flight log to the USB memory stick

6.3 Local Flying

6.3.1 Navigation to nearby airports

6.4 Setup and Fly a Badge or Record Task

6.5 Setup and Fly a Contest Task

7 Setup Menu (Details)

8 Specifications

9 Wiring Diagrams and Cable Schematics

10 Glossary

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